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THE ORGAN.

ITS COMPASS,

TABLATURE, AND SHORT AND INCOMPLETE OCTAVES.

BY

JOHN W. WARMAN, A.C.O:
Late Organist of the Anglican Cathedral, Quebec;
Author of "A Condensation of the Primary Laws of Counterpoint,"
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PREFACE.

The present Work constitutes the first *written* of a Series of *Departments* which are designed to form, collectively, a COMPREHENSIVE TREATISE on the *Construction, Etc.*, of the ORGAN.

It will be seen that the entire *Department* (Work) is broken up into several chief portions. These I have termed *Divisions.* Each has its Heading Separated from its Body. The Divisions again are partitioned, where necessary, into *Sub-Divisions.* The Headings of these also are Separated ones. Of lower rank again are the *Side-Headed* Partitions. The *Headings* of the Divisions are in all cases put in *Full-Capital Italic;* the Headings of the Sub-Divisions are as invariably in *Small-Capital Roman* (Upright); while the Side-Headings are either in *Small-Capital Roman* or in *Small Italic.*

It is to be distinctly understood that, assuming all other things to be the same, any Heading put in *Italic* is always of *lower grade* than any Heading put in *Capital Roman.* Thus, every Italic Side-Heading which next follows a Capital Side-Heading under any Superior Heading is a Subordinate of such Capital; and the same is the case with the Separated Headings themselves. And any one of the latter set in Ordinary (Non Capital) Roman will be Subordinate to a Separated Heading set in Small Italic. Of course, all *Side*-Headings are *Subordinates* of the *Separated* Headings which *next precede* them; and this, in whatover Type the Side or the Separated Headings are put,—as a Capital Side-Heading being the Subordinate of a Small Italic Separated Heading.

The reader will note that a great deal of attention has been bestowed upon certain chapters of *Mr. Hopkins's Work* on the Organ generally. The reason for this is simply that, as a considerable part of that Work has been devoted to an attempted Demolition of the *GG* Compass, and that Treatise has, as a whole, acquired a palpable amount of Authority—rather widely spread—,it became necessary to furnish a proportionately *lengthy Disprovement* of Mr. Hopkins's Allegations; otherwise, any Range Bottom founded, even approximately, upon such *G*, would, obviously, have had *less* likelihood of finding proper Acceptance.

It should be added, that a good-sized Instalment of this my Intended Treatise, though not the actual now given *Department* COMPASS, has *already* Appeared, in an *Immature* and now *Rejected* form, in the pages of the *English Mechanic and World of Science.*

JOHN W. WARMAN.

17, St. Thomas's Place, Canterbury:
August, 1884.

THE ORGAN.
ITS COMPASS.

COMPASS OF CLAVIERS, OF SECTIONS, AND OF REGISTERS: INCLUDING TABLATURE; AND SHORT AND INCOMPLETE OCTAVES.

PRELIMINARY.

What it is that is embraced under the Title COMPASS, which furnishes—as previously said—the first written of the *Departments* into which the present Contemplated Treatise is separated, will be easily understood by the reader: the Compass of the Organ is simply its *range* or *extent;* or, in other words, the precise *definition* of the Notes or *Sounds* actually possessed by the entire Instrument.

The Compass of the *Claviers* will be as readily apprehended to include both the *Manuals* and the *Pedal-board.*

The term SECTION, as employed in the present Treatise, is new. Such term has been devised by the writer, instead of the word *Organ*, for indicating a portion only of the Instrument,—as, the *Great Organ*, the *Swell Organ*, etc.; the reason being that the double use of the word *Organ* itself is liable to cause confusion or tautology. The "Section" (*identical* with the "Organ") may, as strictly defined, be regarded as embracing a grouping of Pipes, with their Windchests and Fittings, but *not* their governing Clavier: speaking broadly, therefore, every Section may be considered co-incident with the Manual or Pedal-board which controls its particular Division of the Pipe-work. In some cases, however, a single Clavier controls more than one Section of Pipes: a Specimen of this is afforded in the Organ built for Mr. Holmes, of Regent's Park, London (and since sold to the Battersea Choral Society), which has both its *Solo* and its *Echo* Sections played from the Solo Manual; while a second Instance is furnished in the Instrument Projected for St. Peter's at Rome, of which the Great Manual operates both the *Great* and the *Great-Choir* Sections. To the several *Proper*, or *Pipe*, Sections, we may add the *Couplers*, which constitute that which may be termed the *Mechanical Section.*

It is quite unnecessary to dwell on the *importance* of the question of what is the Compass that shall be accorded to the Organ. The answer given to this will determine or affect not only the fundamental or *Interior* Lay-out of the Instrument, but, in most cases, the magnitude or altitude of its *Case* Façade also; besides embracing the consideration of the *Secondary Borrowing*,—that is, as to which, if any, portions of a Clavier or Register shall receive the aid of a Borrowing from another Clavier or Register which *is* Complete. And it should be always borne in mind that the *Organ*, from its very magnitude and sufficiency, is not often able to rely on the presence or accompaniment of any *other* Musical Instrument which might *veil* or soften any defect in its (the Organ's) own Compass.

For these reasons it is, combined with the fact that the writer *disagrees* to some extent with the present received Dicta on the subject, that he has now treated the consideration of Compass at some length, and with especial care.

It is essential to add that, throughout this entire *Department*, the Pitch is assumed to stand at a *little below* the present (1884) English "Concert Pitch."

TABLATURE.

As the Organ is, in its Compass of *Sounds*, the most Extended of all Musical Instruments—its Manuale alone being sufficiently Long to contain several Keys which have one same Name—, and has each single Key usually controlling sounds of more than one Pitch, it has obviously become necessary to devise some method or scheme for definitely indicating each of the several Keys or Sounds so comprised. This Method or means of Definition is termed the Tablature; and it effectually prevents the Confusion that would otherwise ensue.

Let the reader now turn to PLATE 1, Diagram 1, which will be found to consist of the entire Diatonic Scale of the Complete Organ, shown with a distinguishing appellative for every note. This Chart of Tablature is composed of Greek, German, Italian, and English (both old and new) elements, with Simplification and Demonstrative Definition by the present writer himself.

The Tablature employed in *Germany* commences by marking the lowest or 32 feet C with *two* short horizontal *Lines beneath* it,—thus, $\underline{\underline{C}}$; the next C above is distinguished by having *one* similar Line beneath it; the next C upwards is indicated by being arbitrarily printed in *Capitals;* the next C above is arbitrarily printed in *Smalls;* the next C up is distinguished by having the figure *One* placed close after it,—thus, C^1, or by a single short horizontal Line set *over* it; the next C upwards again is similarly followed by the figure *Two*, or has *two* short Lines over it; and so on to the top C. It is to be understood that the marking of every C is always retained for the *next Six* notes diatonically above such C; and it will be seen therefore that each distinct marking lasts for a diatonic *Septave*—or *Octave*, as it is more commonly, though less correctly termed—, and that the change is in all cases made on the note *C*. It is to be observed, furthermore, that all the Distinctions are obtained with the employment of single letters only; and, except in two of the Septaves, without any arbitrary use of Capital or of Small Letters.

The *Italian* and *old English* Tablature also continued each specific marking for the space of one Septave; but the Change of designation was made in every case on the note *G*. The Distinctions were obtained by (1) the employment of *one*, *two*, or *more* Letters for a single note, (2) by the arbitrary use of *Capital* or of *Small* Letters,—for both the once and the more than once Lettered notes, and (3) by the adoption of the words "*in Alt*" and "*in Altissimo*" for the highest two Septaves respectively. No addition of Numerals or of Lines was ever resorted to.

The German method of Tabulation, as far down as C,[1] (the employment of *Lines* is understood as here totally rejected), commends itself at once, as being perfectly simple and clear, as being independent of distinction by Capitals and Smalls—so liable to be changed by the Printer—, and as avoiding the especially objectionable old English repetition in Smalls of the Double Capitals of the Bass,—so apt to confuse the latter with the Treble. This Tablature has remained unaltered in Germany; while, down to the C^1, it is now very generally used both in Great Britain and America. For these reasons the writer has retained such upper portion as an intended FINALITY in the Chart given on PLATE 1 aforesaid.

Below C^1, however, the German Tablature is to be decidedly discountenanced; for, while it does not *entirely* escape the objectionable arbitrary employment of Capitals and Smalls, it introduces a *fresh* complication in respect of the horizontal Lines,—which are (as just mentioned) not only liable to be inaccurately observed by the Printer, but do demand the existence of special Type. The German Bass Tablature, therefore, has made no real way in Great Britain; and we have, instead of it, a definite RETENTION and AMPLIFICATION of the old English united-letter method. In this, the 32 feet C is marked *CCCC*; the change to three letters is made at the 21⅓ ft. note, which is thus marked *GGG*; while the next G above is marked *GG*. Each of the two changes is continued for the remainder of the Septave. Here see again in PLATE 1.

But it will be at once evident that the two foregoing Ranges do not *meet* each other by the amount of One and a Half Octaves (Septaves), therefore leaving unprovided for the notes extending from *G* on the lowest line of the Stave with the Bass Clef, up to *B* next above the top line of the same Stave. It is equally obvious that *any* Septave of this portion can be properly and exactly distinguished by the marking of each Note's consisting simply of a *Single Letter*, entirely unaccompanied, and this *without* the arbitrary employment of Capitals or of Smalls. Such Treatment accordingly I have adopted, selecting for it the *highest* Septave,—such selection being made, first, for the better continuance from the *One*-marked Septave next above it, and, second, in order to leave the remaining Notes to be named in a way to retain their *original* significance. This highest Septave can, if desired, be further distinguished by the addition of the words "Tenor" and "Fiddle",—in the frequent English manner; or by placing a single "°" after each letter,—as is regularly done in America. There will now remain only the diatonic Third between FF and [Tenor] C; and, for these—as the expedients of Added *Figures* and *United* Letters have *already* been made use of (and their positions settled), while the distinguishings by arbitrary *Capitals* or *Smalls*, or by Accompanying *Lines*, are both *objectionable*—nothing remains but the addition of a proper *Name*. This, therefore, I have done, employing the word *Gamut*, as (1) being already in extensive use, as (2) indicating the Greek origin of our Musical Scale, and as (3) furnishing a distinctive term for an important and often quoted note on the Organ Manuale. The whole of the foregoing also will be seen in the PLATE.

The present writer's share in the Tablature so set forth thus consists only in the Unification and Simplification of the Marking, and (especially) in showing that with such a Tablature there are no distinguishing *Names* required for any except a very few Notes, and that the arbitrary employment of Capital or of Small letters is entirely unnecessary. This last restriction, as having become liable to cause confusion or vexation, should be at once dropped, and the use of Capitals or of Smalls be governed solely by the ordinary rules of Compositional suitability and uniformity.

In *America*, the German Tablature has been adopted, unaltered, down to C^1: the next Septave below this is defined by each Letter being followed by a *Nought*, placed *upwards*, thus,—C^0: the next septave lower again is marked with a similar Nought, but placed *downwards*, thus,—C_0: the next septave again is sometimes *Underlined once*—like the German—, though with usually the *Nought* (still set downwards) retained also; but sometimes with a figure *One* occupying the place of this nought,—thus, C_1, in which latter case the Line is generally omitted: the next and final Septave is marked like the last preceding as regards the Nought, but has *two Lines* or a *figure Two* instead of one Line or a figure One.

This American Bass Tablature is, however a poor affair; for, though it avoids the objection of possible confusion through non-observance of Capitals and Smalls, it introduces a worse defect instead,—because the chance of a type's being set in a wrong *position* is obviously greater than the chance of a wrong type's finding *admission*. The turning upside down of the accompanying *Nought* will here, remember, at once give an exact Duplication of a Marking; while a *virtual* such Duplication will as inevitably result from an inverting of the accompanying figure *One*. In point of fact, the Bass Tablature of America is utterly wanting in Simplicity, Fixity, and Definiteness; and the sooner it is abandoned the better,—an additional reason for its being replaced by our *own* Marking consisting in the fact of the English Language's being common to both countries.

It is true that the British Tablature, as I have presented it, has not the visible Uniformity and seeming Simplicity of the German: but these advantages are superficial only,—the British being really as superior to the German as the latter is to the American. The *chief* good points of the Tablature as given in PLATE 1 will have been already seen by the reader, but, in order to the more firm establishment of its position, it is as well here to mention the whole of them :—

First, no method of Indication is employed *Twice:* Second, the *Shifting* of the place of the Adjunct (the accompanying mark) will not Alter the signification: Third, it is everywhere immaterial to the indication whether a *Capital* or a *Small* letter be used: Fourth, all the Terms applied are *Short*, —as "Four C's", "Gamut G", "G^3", Etc., (the words "Alt" and "Altissimo" are, remember, no longer *necessary*): Fifth, every Signification is expressed in Type of the *ordinary* kind: Sixth, the variation in the Number of the Letters is in the same *direction* as the variation in the Length of the Pipes which they represent: Seventh, most of the Notes admit of being easily expressed by ordinary *wording* (as, "Double C"),—thus allowing of their being, if desired, printed in *Capitals*, *Italics*, Etc.

There are only *two* objections that can possibly be brought against the British Tablature, as I have now given it. These are;—that some *Names* are employed in addition to the Letters; and that, while the changes in the *Terms* are mostly, and in the numbers of the *Letters* invariably, made on a *G*, the changes in the added *Figures* are always made on a *C*.

The first of these objections is of no real moment whatever: the total number of the notes distinguished *solely* by Names amounts only to *Five*, even with the Semitones included; and it has just been seen that in these the Term employed is one which it is *un*desirable to abolish. And *all* the names made use of are, remember, Short. The second objection has more weight, as the varying of the Change-point is of course a departure from uniformity and consequent simplicity: but even this is here of little actual importance; for, as the variation is caused by the mixture of the *English* with the *German* systems, there is a counterbalancing advantage in the fact of the Tablature itself's preserving a *record* of such original or national starting notes. The two Change points are also in approximate agreement with the respective bottoms of the *Vocal* Bass and Tenor Ranges, and with the *Ideal* bottom limits of the Manuale and Pedale Claviers (see on these considerations under Division *Comparison of Compasses*, some distance forward); and the G point is, further, in harmony with the most economical *Basic* note actually given by the writer for the Pedal Section (see under Division *Conclusions Reached*, near the end of the present *Department*).

The general adoption by Great Britain of the German Upper Tablature, and its engraftment upon the old and Retained English Bottom Marking, are partly owing to the judicious advocacy furnished by Mr. (now Dr.) *Hopkins* in his work THE ORGAN (see under Division *References to Further Information*, at end of the present *Department*): indeed, he may be regarded as being in agreement with the whole of the foregoing—see his pages 100-1—, and has actually mixed Capitals with Smalls in several places. Mr. *Hiles*, in his CATECHISM (see again under the said Divis. *References*) has largely followed Hopkins, and so has also assisted in such adoption of the *English-German* Marking. It is hoped that the present author will be enabled, by means of the *Department* now laid before the reader, to still further confirm the acceptation of this Tablature, and to aid in its extension to other countries.

All that has been hitherto said has been assumed to apply only to the Tablature of the *Claviers*. But—as was seen at the beginning of the present *Division*—each single Key of the complete Organ governs sounds of *more* than one Pitch; and it therefore becomes obviously necessary to have some equally accurate method of indicating such *Sounds*, independently of the Keys themselves. For this purpose also the same Tablature affords the best means, *saddled* with the simple proviso that the natural or *Eight* feet Pitch is always in such case to be understood. Thus—as an illustration—while the words "Manual Double Diapason down to Gamut G" will always signify that the largest Pipe of such Stop, if Open, is of $10\frac{2}{3}$ feet "Length", the words "Gamut G *Pipe*" will invariably mean a Pipe which, if Open, is of $5\frac{1}{3}$ ft. "Length."

CONSIDERATION OF NECESSITY FOR UNIFORMITY IN COMPASS.

The *Fluctuations* of Musical *Pitch* having, during a long series of years, been so considerable—amounting to MORE THAN A MINOR FOURTH (see Ellis's *History*)—, it is of course impossible to fix on any one Compass that shall exactly suit all the Musical Compositions now in existence. But as, at the present time, the Pitch stands at *nearly midway* between the two extremes that have been reached, a good opportunity is manifestly so afforded for a determination of an UNIFORM Organ Compass which shall be practically satisfactory and Final. (Here see what is said at the end of the *Preliminary* Division).

Necessity as to Economy in general Manufacture.—It will be easily apprehended that any Variation in the Compass of different Organs must tend to increase their Cost, by to such extent destroying *Uniformity* in their Manufacture; and also that such increase will be *greater* according as the Pipes, and the Space, etc., required for them, become *larger*,—so as to more or less affect the entire Set-out of the Instrument. As the result of this enlargement it follows that any Variation in the Compass of the *Manuale* is less palpable than when made in the *Pedale*, and that any similar Variation of the *Bottom* of either the Manuale or the Pedale is more disturbing than when occurring at their *Upper* portions.

With regard solely to the *Bottoms* of both the Manuale and the Pedale, it will be directly seen that *other* considerations exist to enforce the Economy derivable from Uniformity in the Compass of such boundaries. As respects the *Tops* only of the Claviers, it may be accepted that Variations in such Termination of both Manuale and Pedale are sufficiently desirable to *over-ride* the question of Economy in Manufacture.

Necessity as to the Rendering of the Music.—So far as concerns the Music itself, it is manifestly of little import in the *abstract* whether Uniformity of Compass be observed or not, either in the Manuale or in the Pedale, so long as all the Keys are actually present that are required for the performance of the Composition which is being executed.

It will, however, be found that it is, from divers causes, advisable that the *chief* Manual Sections of all Organs be Uniform in their Compass *Downwards;* also that it is really necessary, if economy of Cost in any single Instrument is to be secured, that the Downward Range of its Pedale do *correspond* with that of such chief Manuale,—for the sake of Supplementing such Pedale by Coupling its Manuale thereto. Of course, theoretically, the Pedal Section should always be large and complete enough to be independent of such Supplementation; but, actually, it is not often that the Funds and Space at disposal are adequate to this.

In addition, it may be considered that Uniformity in the Downward Compass of the Pedal-Organ is desirable on *abstract* Musical grounds; for, practically, there is no escape from the having to make the [Pedal] Keys descend *as far* as CCC, while yet it would be absurd to carry them *below* such note.

With reference to the *Upward* Compass of the Claviers, it is sufficient here to observe that on *no* grounds of the actual Rendering of the Music is Uniformity of Limit required, either in the Manuale or in the Pedale.

Necessity as to the Lateral [Right and Left] Position of the Claviers.—The MANUALE must be first treated of:—

In respect of the Position of the Manuale, it cannot be said that Uniformity of Compass at either its Downward or its Upward Limit is of real moment, the reason being, that as the Key-board for the Hands is palpably shorter from right to left than is that for the Feet, while yet the human arms are more easily extendable than are the human legs, the Player will have no difficulty whatever in reaching any added Keys at either end of the Manual, *without* shifting his or her body from the point opposite any particular Key which it is agreeable or desirable to adopt for indicating such point. (Such "standard" Key will of course be the one which is either at or not very far from the Normal centre of the Manual; see further on, under Division *Conclusions Reached*, in connection with what is said as to Placing the Pedals with their *DD*♯ under the Manual C.) There exists also the consideration that the Hand Clavier is in full *view* of the Player.

Bear in mind that the *Manuals* are always placed at the lateral [sideward] *centre* of the Organ-Case; and that the Pedal-board, if not central with the Manual, is thus non central likewise with such Case.

A Greater or a Smaller Extent of Manuale Compass will, obviously, cause a corresponding variation in the existent amount of the sideward Projection of the Pedal-board beyond such Manual.

Any Variation in the Compass or Bounding Notes of Manuals which are alike in the *number* of the Keys they contain will also affect the lateral Position of any Pedal-Clavier of given Range; for (as will directly be more fully seen), it is essential that the Pedal-board be always placed with a *given* one of its Keys brought perpendicularly beneath one certain Key of the Manual. In consequence of this, no extension of the latter below CC will avail to decrease the amount of Pedal-Clavier side-Projection beyond the Manual sides, *except* at the *Bass* end.

The consideration of the Relation between the Uniformity of the Compass and the Position of the PEDAL-BOARD requires to be rather more extended:—

For several reasons, one of which is that the Pedal-board is in great measure *hidden* from the Player, it is highly desirable that the latter, when seated at his proper point at the Claviers, shall have, in every Instrument, some *same* one of the Pedal Keys beneath him situated at an unvarying *point* in the direction of his from right to left. If this be not the case the difficulties of his Pedaling will be increased, and this in a ratio corresponding with the extent of the divergence of the Pedal posit from that to which he is accustomed,—until, if such divergence amount to as much as is given by the substitution of, say, *G* for *C*, or the reverse, his embarrassment will be generally sufficient to cause his abandonment of the Pedal Part altogether. And, even if he be ready or practised in the art of playing upon Pedal-boards of varied Range and Key-Location, such art will be so much *detracting* from his real maximum of Attainment on Claviers with which he is quite familiar.

Of course the Player *can*, under all circumstances, easily seat himself so as to have *any* Pedal Key lying at the desired point beneath his foot. But there are, in performance, two things which effectually prevent this. The first is that the only Compass of Pedals which is now practically admissible (having regard to *every* kind of Music) renders their Board so *wide* that the Organist is virtually tied to its *centre*,—in order to enable him to reach the farthest Pedals at either of its ends; and therefore any change in the Pedal Compass, even although the *number* of the Pedal Keys remains the same, will inevitably bring a *different* Pedal perpendicularly under him. The second obstacle is, that even when the Player is seated correctly with respect to his Pedals, he will still be "wrong" with his *Manuale*, unless the Pedal-board be properly placed in relation to the latter. And any wrong position with the Manuals is manifestly out of question; for, they being the chief Claviers, it is essential that the Organist be *first* seated correctly as to *them*, and *then* that the Pedal-board be placed in proper position with him *as* so seated. There exists also, remember, the fetter of the Bottoms of the Manuale and the Pedale having to be *alike* for the purpose of the former's supplementing the latter.

It has already been intimated that the Pedal-board is, in the direction of its from Right to Left, of wider dimension than is the Manual. It is as well here to add, that the total width of a Manual Key-board of ordinary Scale, and of Compass from CC to G^3, is only about 2 ft. 6½ inches; while a Pedal-board of 2¼ inch Scale (which is ⅛ inch *less* than is commonly used), and of Compass only from CCC to Tenor D, will measure as much as 2 ft. 11 inches. (It is to be understood that these dimensions are, for both Man. and Ped., as *without* reckoning the Cheeks of the Key Frame.) The reader will find that, while G^3 is *not* the shortest Upward Range permissible for the Manuale, Tenor D *is* the shortest such Compass allowable for the Pedals, and that these latter constantly ascend to Tenor F, and occasionally even to Fiddle G.

It thus becomes evident that the Absence of Uniformity in the Ranges of Pedal-boards cannot be compensated for by the simple placing of such Pedals in every case with one *same* Key of them beneath one particular Key of the *Manuale*, for the Organist will not be able to escape from having to seat himself *centrally* over *each* of the Varied Boards,—unless their Compass be Insufficient.

Two other Objections which exist to the Pedal-board's Projecting palpably more beyond the Manual at one end than at the other have not been yet mentioned. The first is the one-sided Appearance caused. The second is the increased difficulty of Entering the Pedal-Frame between any Side Projections-forward of a laterally narrow Case-Façade,—the *Manual* being (as already seen) always set at the *middle* of the Façade.

From what has been so far said we deduce these points:—That if the Compass of the Pedal-board did not exceed *One and a Fifth* Octaves, the Names of its Terminal—and of course of also its remaining—Notes might be Varied to a *palpable* amount *without* Violating the Requirements of the Claviers' Lateral Position;—That if such Compass were *Two* Octaves only, the Names of its Terminals might be Varied to a *small* amount without interfering with such Position;—That if such Compass be of as much as *Two and a Second* Octaves its Terminals can *hardly* be Changed without Violating such Position;—and That if such Compass attain to *Two and a Fourth* Octaves ("Full" Range) its Terminals *cannot possibly* be Changed without the Claviers' Position being upset.

The foregoing has been given chiefly for the sake of information, for—as we have just seen—the "general" Pedal-board Compass is now demanded to be so *Extended* as to practically compel the Player to be seated always at its Central point; and, therefore, all Radical Variation of such Compass is virtually put an end to. Here see—at some distance on—what is said as to the Terminating notes, in Divisions *Comparison of Compasses* and *Conclusions Reached.* It is quite true, as will be also found in the same places, that a Pedal Range which has *GG* for its Bottom Note may have its Extent limited to One and a Fifth Octaves; and that such a Pedal-board will be really satisfactory so far as concerns the Accompaniment of Sanctuary and other strictly *Vocal* Music: but a little reflection will convince that it is out of question to possess *two* recognized Distinct Ranges for the Pedal-board Bottom,—one for one Type of

Organ—such as that for the Church—, and the other for the alternative Type —such as that for the Concert-Room—; because definite Lines of Demarcation between these different Species of Instrument do not exist, and the *Organs* themselves are *much* interchanged, and the *Players constantly* so. In addition, there is the desideratum of being able to *practise* any kind of Music upon the one Instrument.

[It should be remembered that *every* Organ which is worthy of the name possesses a Pedal-board of *some* kind, and, consequently, that the Consideration of the Involution of Clavier *Position* with Clavier *Compass* cannot be *ignored*.]

Summary.—As Final *Dicta* here we may confidently accept the following:—

With regard to the MANUAL *Claviers*, there is no *theoretical* necessity for Uniformity in their DOWNWARD Compass, though, in *practice*, strict Uniformity in such direction is really *obligatory* in all Organs. But in the UPWARD Range of Manuals, Variations to the extent of at least *Half an Octave* are not only *permissible* but *advisable* in different *Organs*, though not allowable in different *Manuals* of one same Organ.

With respect to the PEDAL Claviers, as the CCC Boundary is now regularly recognized, strict Uniformity in such DOWNWARD Compass has become absolutely *necessary*, both theoretically and practically, in all Instruments. But in the UPWARD Termination of Pedal-boards, Variations in different Organs are again *expedient* in many cases, though here, remember, only to the extent of *Three*, or at most *Four*, *Notes Diatonically*. [It is, of course, to be understood that the *Lateral Position* of the Pedal-board is to be exactly the same with all such four (or other) of its Compasses, and this in all Organs, of whatever kind.]

SHORT AND INCOMPLETE OCTAVES.

In this *Division* will be found sufficient matter relating to that which comes really under its Heading as given. The consideration of such early Claviers as were ENTIRELY or *almost* entirely without *Semitones*, obviously belongs rather to the domain of *History* than to that of the present *Department*, and is therefore reserved for awhile; two or more Specimens will, however, be seen in the Table of Ranges furnished at a little on, under Division *Instances General.*

During a Period commencing at the *close* of what may be called the Historical age of Organ Building, it was customary, owing to the great Cost and Space always demanded by the largest Pipes—in comparison with the requirements of the smaller ones—, to leave the Bottom Octave of the Instrument absolutely wanting in one or more of its *Notes*. The *Keys* for such Notes either served for some *Other* Notes, or were present only as "*Dummies*", or were *Absent* altogether.

At first the Omission assumed the form of what is termed a SHORT-OCTAVE;

that is to say, the *Pipes* of the Lowest one or more of the "Sharps" were dispensed with entirely, and the Lowest one or more of the *Natural Keys* were similarly suppressed, their Pipes being, where not also absent, transferred to the "Short" Keys or "Sharps" already dumb by the absence of their own Pipes. Owing to such suppression, the lateral *space* occupied by the lowest "Octave" of Keys was of course *less* than, that is to say, SHORT of, its proper amount;—whence the Name.

The earliest Short Octave Claviers of which we have any reliable account descended to *CC*. The Order and Names of the notes (Manuale) were thus:—The Bottom Key, seemingly EE, sounded CC; the next Key up was both apparently and actually FF; the next Key, seemingly FF♯, gave DD; the next both appeared and sounded G; the next again, seemingly G♯, gave EE; and on and after the next Key, A, the proper Order and Completeness were observed. The *absent* Notes were therefore the lowest four *Sharps*, viz., CC♯, DD♯, FF♯, and G♯. A *Specimen* of this Treatment existed in the Organ of St. Michael's, Vienna; see again in the Range Table furnished just onward, under Division *Instances General.*

In England, at some time later on, the same Treatment was common with the Lowest Octave of the Manuale going down to *GG*, excepting that *one* of the *Naturals*, viz., BB, was sacrificed, while the DD♯ was retained,—the Keys thus commencing their Completeness and proper Order on *DD*, the *third* Natural from the bottom. By reckoning—with the exception stated—the Notes of the St. Michael's Short-Octave at *One-Fourth* Lower, the actual Keys and Sounds of the GG Treatment will of course be obtained. One of many *Specimens* of this kind of Clavier occurs or did occur in the Organ at St. Botolph's, Aldgate, London; see for it also in the aforesaid Table under *Instances General.*

Of a Clavier like the preceding, *except* in descending to *FFF*, there seems to be no record of a Specimen, though very probably some such Instruments *were* made. The nearest approach known appears to be the London Temple Church Organ, the chief two Manuals of which, as originally constructed, went down to FFF, and had their FFF♯, GG♯ AA♭, and DD♯ omitted. This Instrument, likewise, will be found in the *Table* of Range Instances.

In yet other cases the Treatment adopted was the same as in the St. Michael's Organ first cited, *excepting* that *only* the Lowest *two* of the four Sharps there named were here wanting, the Highest two, FF♯ and G♯, being supplied on and by an *Elevated Back Half* of each of the Lowest two of the "Short" Keys. This kind was termed a *Broken* [Short] Octave. No Instance, in either the past or the present, is known to the writer.

Of the preceding Treatment, and also of the first named two, the reader will find Diagrams on page 152 of Hiles's *Catechism*, already referred to at near the end of Division *Tablature.*

[It is hardly necessary to observe that any one of the afore-going Treatments could be applied to Key-boards of *any Compass.*]

As time went on, the Clavier had its omissions supplied in so far as that the whole of the *Natural* Notes were present, and this on their own or "Long" Keys, but with the *Lowest* one or more of the *Sharps* still Wanting. Such was said to be an INCOMPLETE-OCTAVE Key-board.

This kind of Octave was freely employed in the older Organs of Italy, many of which had and still have their Manuals, or the chief of them, descending to *CCC*. The actual Treatment adopted is the suppression of the deepest two Sharps, and the so arranging the eight Naturals that the *Dominants* and *Tonics* of *F*, *G*, and *A*, lie side by side: here turn again to PLATE 1, No. 2 on which is a Diagram, modified from that given by *Hopkins* on his page 412, representing this particular form of Incomplete Manual. An important *Specimen* of the Treatment is or was afforded in the Chief Organ in St. Peter's at Rome; see again onward, in the *Table of Ranges*. It should be mentioned that Mr. Hopkins calls the present a *Short* Octave, which term is, manifestly, not a strictly distinctive one.

Still later on, the Clavier was made so that only *one* of its notes, viz., the *Lowest* Sharp, was Wanting, and *no* Irregularity whatever existed in the *Order* of the Sounds. *Specimens* of this do or did occur in the following:—With Manual descending to CC, Mr. M. Bradley's Organ, Leominster (since at Heckmondwike),—the *Key* itself being, however, present as a dumb one: With Claviers descending to GG, the Instrument in St. Alphege's, Canterbury, —the Key also being here absent: and With Pedal-board descending to FFF (Deepest Manuals down to GG), in the Whitehall Chapel-Royal Organ, London. All three of these Instances will be found in the *Table of Ranges*.

A kind of Clavier Bottom that does not come under either of the foregoing Heads consists of an apparently Complete Octave extending from CC upwards, but having its seeming CC♯ Key sounding AA. This Treatment was sometimes employed in England during Father Smith's time: Specimens were furnished in his Instruments at St. Nicholas's, Deptford; the Danish Chapel in Wellclose Square, London; and the University Church at Oxford. It will be seen, that with the addition of a single Key, placed next below the CC, and sounding GG, such a Manual becomes the "Short Octave G" described at a little back; and this latter was, in fact, the derivative and continuation of the present *Anomalous CC* Manual. I have not included any Specimen of it in the Instance *Table of Ranges*, because it seemed impossible to know under which "Bottom" to place it; but the Dates and Particulars of sufficient of both Short and Incomplete Octave Organs by Bernard Smith and those who worked with and after him will be found in the GG-Bottom portion of the Manuale *Sub-Division* of such Table.

Occasionally the TOP of the Manual has been made Incomplete; as, for instance, with the Highest Sharp wanting in a Key-board ascending to D^3. A *Specimen* of this last was afforded in the Organ of the Minorets' Church, Cologne; see once more in the Range Table, under its CC-Bottom Manuale portion. But all Incompletenesses at the top of the Manuale are so un-important and comparatively unusual, because the Pipes and Space required are there so small, that no further notice needs be here taken of any such Omissions.

[In the present Treatise, therefore, the terms "Short" and "Incomplete" are always to be (as they are, in fact, generally) understood to refer to the *Bottom* of the Clavier, unless it is definitely expressed otherwise: and to this it should be added that the word "Incomplete" is always to be taken as relating to the *Lowest* Sharp or Sharps of the Clavier, unless it is similarly stated to the contrary.]

Short and Incomplete Octaves continued to exist in England throughout the Eighteenth and the first portion of the present Centuries. Nor did the Defect entirely cease to find support, even then: *Eagles*, of London, who was working at least as lately as the year 1857, persisted in making *Incomplete GG* Organs down to almost, if not quite, the day of his death.

It hardly needs to be stated that all Shortnesses and Incompletenesses of any Clavier, such as or similar to those which have now been described, are absolutely and always WRONG and INADMISSIBLE for ANY properly constructed Organ. The Treatment has now virtually ceased in all *New* Instruments; while a large number of Old ones which it disfigured have been Re-modelled with their Claviers Complete. Certainly, there has always existed this *excuse* for both *Shortness* and *Incompleteness*, viz., that wherever either Defect has been admitted, the system of *Unequal Temperament* has been usually—if not invariably—employed for the Tuning; and the Excluded Notes were, therefore, enabled to be mostly such as would, under *any* circumstances, have been inadmissible as *Tonics*.

INSTANCES GENERAL.

Here follow a sufficient number of GENERAL INSTANCES of Clavier Compass, selected from the Organs of various Countries, and Tabulated and Arranged according to their Downward and Total Extent. Some of the Specimens, however, may be only as *Contemplated*: others are not altogether *Authenticated.*

(The writer has not been able to discover a Key-board *Descending* to any *other* Note than some one of those here given.)

It should be observed that the HEADINGS of the Table specify the Ranges therein contained to be those of Claviers *and* Sections. This is because in some cases the Range of the Pipes may not be *coincident* with that of the Key-board which appertains to them; while in other instances—only, however, on the Pedal *Sub-Division*—the Pipes may be Wanting altogether.

In all Cases where the Manual finishes on *CC*, or on any note *above CC*, it is to be understood that its Pedal-board extends BELOW such Manual; and thus the *Coupling* of the latter to the Pedals will, if existent at all, be done in the *Octave* above. [The Marking of such Coupler itself, to be strictly correct, should therefore be "Super-Octave Great" (or other Man.) "to Pedale"; but, as a fact, such Marking is never applied; neither is it practically necessary.] With this understanding the Pedals to the CC Manuale of course really go down to CCC; and, as they will have to ascend as high as do those the Bottom Note of which is "G" (see further on), it follows that such G Pedal-board must be regarded as the "C" Board with its lowest Keys *omitted.* It is hardly required to add that with a CCC Pedal-board the *deepest* Pedal Register must never be in *Unison* with the 8 feet Stops of the Manuale.

[The reader will now perceive, that in Pedal Obbligato Music intended for the CC-CCC Organ, the Foot Part is really written *One Octave higher* than it is played, and should, consequently, in strictness, be always accompanied by the Direction "8ve. lower".]

In all Instances where the Manual descends *below CC*, its Pedal-board is to be reckoned as extending NO LOWER THAN does such Manual, the latter being then therefore *in Unison* with its Pedals, and *Coupled* to them, if at all, *in* such Unison. Consequently, the Bottom note of the proper Pedal-board to every GG Manuale will be GG also. It is thus obvious that with GG Pedals the Deepest or only Register on them is *not* absolutely prohibited from being in Unison with the Manual Diapasons; and that such Unison Register will sound one Octave lower than the notes of the same Pedals in a "*C*" Organ which (wrongly) has its Pedale Lowest Stop an "Unison."

[This Method of regarding the C and the G Pedal-board Compass is rendered additionally advisable from the circumstance that the Manuals have sometimes been carried down to *CCC;* for it would, in such a case, be—manifestly—absurd to speak of the Pedals as descending only to *CC.* This is especially evident because, with the Manual reaching to CCC, the Pedal Section does not undergo any real alteration in its *Compass* or *Pitch*, but only in the *number* of its Registers. There was, it is true, once furnished, in the *York Minster* Organ (see the Table) a specimen of CCC Manuals accompanying that which may be termed a *CCCC* Pedale; but this Instrument was an entirely exceptional and anomalous one; and even it has been—long since—wisely Remodelled to the usual CC-CCC Type. The aforesaid considerations do not seem to have been apprehended by some Organ writers, who have, in consequence, persisted in speaking of the "C" Organ Pedal-board as going down only to *CC.* Among these may be again cited Mr. *Hiles*, in his Catechism, indicated at near the end of the present *Department.* It is necessary to add, that the reckoning of the "G" Pedal-board to extend only to GG is, in the abstract, often unfair to that Clavier; for the latter more frequently commands a "Double" to its Bottom than does the CCC Pedal-board; while yet all such "Doubled" GG Boards, though their sounds descend to GGG, are, by such reckoning, made to appear of *less* Profundity than is the ordinary "C" Pedale,—which sounds no Lower than CCC.]

It is to be further noted that:—

The Instances of SHORT and of INCOMPLETE OCTAVES have been, wherever known, kept *Separate* from each other, and from the Instances of COMPLETE Claviers. But it will be obvious that *mistakes* are not unlikely to have crept in here.

The DATE given with each Instance is, so far as I have been able to ascertain it, that at which the *Clavier* or Claviers possessing the particular Compass named were actually executed or brought to such Compass; and such Date is, therefore, by no means necessarily that of the *entire* Organ, or even of the later or present phase of the Clavier or Claviers so cited. Of course, also, some of these Dates may be too *Early*,—as when the Range has been, unknown to me, extended at a time subsequent to the year which I have quoted. A Special *Illustration* of doubt concerning this last is afforded in the Upward Compass (Tenor D) furnished for the [CCC] Pedal-board of the Later Organ in *Como Cathedral.*

The names of the MAKERS are stated under the *same* conditions, considerations, and reservations, as are the Dates aforesaid.

Every MANUAL, however *Short*, in an Organ, is reckoned as a *bonâ fide* Clavier, unless it be a mere Half, met by another Half,—as in the FF Manual at *Uley Church.*

The next column to the last on the Right in the Pedal *Sub-Division* will be found to contain Indications of BREAKS and CONTINUITIES in Pedales of GG and FFF Range, including of some Sections—such as that at *Canterbury Cathedral*—which are shorter than the Pedal-boards which govern them.

In the last column on the Right, in both the *Sub-Divisions*, are given such CHANGES from the stated Compass, etc., of the Instrument, as are known to the writer. Doubtless here have been, besides, many Alterations that have *not* so transpired.

A few ABBREVIATIONS will be seen here and there. Of these, *abt.* stands for about; *bel.* for believed; *bros.* for brothers; and *prob.* for probably.

TABLE OF RANGES OF MANUAL CLAVIERS AND SECTIONS.

RANGE DOWNWARDS.	RANGE UPWARDS.	LOCATION.	DATES OF SECTIONS.	MAKERS CONCERNED.	TOTAL NUMBER OF MANUAL CLAVIERS IN THE ORGAN.	TO WHICH MANUAL OR MANUALS THE GIVEN COMPASS REFERS.	KNOWN CHANGES SINCE DATES HERE GIVEN. REMARKS.
To Middle C	To D^3 (27 notes)	Geneva Cathedral	1705 (abt.)	Gerger	4	Echo	Organ entirely Rebuilt, by Merklin, in 1865
		London, Temple Church	1682	Father Smith (Schmidt)	3	Echo	Organ entirely Rebuilt in 1878
To Middle C	To E^3 (29 notes)	Salisbury Cathedral (not certain)	1710	Renatus (René) Harris	4	Echo	Organ Removed in 1792
To Middle C	To F^3 (30 notes)	Canterbury; Imitative Oboe, *Mr. Hobday's*	1845 (abt.)	Eagles of London	1		Now partly Broken up
To Fiddle G	To C^3 (30 notes)	*No Information*					
To Fiddle G	To D^3 (32 notes)	Geneva Cathedral	1705 (abt.)	Gerger	4	Recit	Organ entirely Rebuilt, by Merklin, in 1865
		London, Temple Church. (Horn down to Tenor F)	1750 (abt.)	John Byfield, *Junior*	3	Swell	Since Extended to CC (bel.)
		Southwell, Collegiate Church	1697 to 1766	Father Smith; Completed by Schnetzler ("Snetzler")	3	Swell	

To Fiddle G	To E^3 (34 notes)	London, St. Mary's, Rotherhithe	1764	John Byfield, *Junior*	3	Swell	Organ Added to in 1859
		London, St. Stephen's, Walbrook	1760 (abt.)	George England, *Senior*	3	Swell	Organ Rebuilt in 1872
To Fiddle G	To F^3 (35 notes)	Canterbury, St. Alphege's	1819	Goldfinch of Margate	2	Swell	Unaltered to 1883
		London, St. Luke's, Chelsea	1794 (abt. or later)	Nichols; Completed by Gray	3	Swell	Organ since Added to
		London, St. Margaret's Westminster	1804	Avery	3	Swell	Organ Rebuilt in 1867: Replaced by a New One in 1883
To Tenor F	To C^3 (32 notes)	*No Information*					
To Tenor F	To D^3 (34 notes)	*No Information*					
To Tenor F	To E^3 (36 notes)	Lynn Regis, St. Margaret's	1754	Schnetzler	3	Swell	Unaltered to 1855
To Tenor F	To F^3 (37 notes)	Abbeville, St. Wolfran's (sometimes called Cathedral)	1845 (prob.)	Lefevre of Abbeville (prob.)	4; One being for the *Pedale*	Swell	Unaltered to 1855
		Hampton Court Palace	1660-1708 and later	Father Smith; also Hill	3	Swell	
		London, St. Dunstan's, Fleet Street	1834	T. R. Robson	3	Swell	Pedale, etc., Altered, by Holdich, in 1876
To Tenor E	To D^3 (35 notes)	London, St. Botolph's, Aldgate	1720-39	John Byfield, *Senior*	3	Swell	Organ Rebuilt in 1867

To Tenor C Incomplete Entirely	To D^1	Winchester Cathedral (bel.)	951 (abt.)	By Order of Bishop Elfege (Alphege or Alphage)	Rods		Organ Long since Disappeared
To Tenor C	To C^3 (37 notes)	*No Information*					
To Tenor C	To D^3 (39 notes)	Chichester Cathedral	1851	Hill	3	Swell	
		Great Yarmouth, St. Nicholas's (Parish Chu.)	1733	Byfield *Senior*, Jordan, and Bridge	3	Swell	Remodelled to CC to G^3 in 1875
To Tenor C	To E^3 (41 notes)	Canterbury Cathedral	1841-2	Hill	3	Swell	Section Unaltered to 1883
		Durham Cathedral	1844	Bishop	3	Swell	Organ since Replaced by a Larger One
		Nottingham, St. Mary's	1749-80	Schnetzler	3	Swell	Rebuilt and Extended to CC to A^3 in 1871
To Tenor C	To F^3 (42 notes)	Amiens, St. Remy's	1842	Monks of St. Basil	3	Swell	
		Ely Cathedral	1851	Hill	3	Swell	Enlarged and Extended to CC in 1867
		London, St. Anne's, Limehouse. (Exhib. '51)	1851	Gray and Davison	3	Swell	
		London, St. John's, Hackney	1828 (bel.)	Gray	3	Swell	Organ Improved in 1863
		London, St. Olave's, Southwark	1844-6	Lincoln; "Perfected" by Hill	2	Swell	
		London, Temple Church	1843	Bishop	3	Swell	Believe since Extended to CC

To Tenor C	To F^3 [Continued] (42 notes)	Newark - on - Trent, Parish Church (bel.)	1853 (abt.)	Forster and Andrews	4	Solo	
		Worcester Cathedral, Choral Organ	1842	Hill and Co.	3	Swell	
To Tenor C	To G^3 (44 notes)	*No Information*					
To Tenor C	To A^3 (46 notes)	London, St. Martin's Hall	1855	Hill and Co.	3	Swell	
To Tenor C	To C^4 (49 notes)	Bristol, St. James's. (Keys up only to E^3, 41 notes)	1824	Smith of Bristol	4 (One chiefly Borrowing)	Swell	
To Tenor C	To F^4 (54 notes)	New York, Trinity Church	1825-50	Henry Erben of New York	3	Swell [only] (2 Stops to CCC)	Believe since Remodelled
To Gamut B Incomplete	To A^1 (22 notes)	Halberstadt Cathedral (prob.)	1359 or 61	Nicholas Faber	3 (stated)	First and Second Manuals	Long since Altered
To Gamut B Incomplete entirely	To C^2 (16 notes)	Magdeburg Cathedral (prob.)	End of 11th Century	No record	1 (prob.)		Long since Altered
To Gamut G	To C^3 (42 notes)	*None Known*					
To Gamut G	To D^3 (44 notes)	Bristol, St. Mary-Redcliffe's (bel.)	1729 (prob. abt.)	John Harris (*Junior*), and Byfield *Senior*	3 (bel.)	Swell	Afterwards Shortened to *Fiddle G*
To Gamut G	To E^3 (46 notes)	London, St. John's, Horselydown	1770-1844	Crang and Hancock; Enlarged by Walker	3	Swell	Organ Enlarged in 1873
		London, St. Katherine's, Regent's Park	1778	Green	3	Swell	
		Salisbury Cathedral	1792	Green	3	Swell	Organ is now in St. Thomas's, Salisbury

To Gamut G	To F^3 (47 notes)	Cambridge, Trinity College	1850 (abt.)	Hill	3	Swell	Believe since Extended to CC
		Lincoln Cathedral	1826-51	Allen, *Senior* and *Junior*	3	Swell	
		London, St. Gabriel's, Pimlico	1853 (abt.)	Bevington	3	Swell	
		London, St. James's, Bermondsey	1829	Bishop	3	Swell	Organ Renovated in 1877
		London, St. James's Chapel Royal	1837	Hill and Davison	3	Swell	
		London, St. John's, Waterloo Road	1824	Bishop	3	Swell	Believe since Extended to CC
		London, St. Paul's Cathedral, Choral Organ	1849	Bishop	3	Swell	All Manuals made CC to A^3 in 1872
		London, St. Saviour's, Southwark	1840-1	Bishop	3	Swell	
To Gamut G	To G^3 (49 notes)	*No Information*					
To FF	To F^3 (37 notes)	Uley, Gloucestershire; Church (bel.)	14th Century	No record	1, in two Halves		Organ probably now Disappeared
To FF	To C^3 (44 notes)	*No Information*					
To FF	To D^3 (46 notes)	*No Information*					
To FF	To E^3 (48 notes)	Greenwich Hospital	1789	Green	3	Swell	Organ Rebuilt in 1872
To FF	To F^3 (49 notes)	Cambridge, St. John's College	1839	Hill	3	Swell	

To FF	To F^3 [Continued] (49 notes)	Chester Cathedral	1844	Gray and Davison	3	Swell	Organ since Replaced by a Larger One
		London, St. Mary's, R. C., Moorfields	1849-55	Bevington and Son	3	Swell	
		London, Whitehall Chapel Royal	1844	Hill and Son	4	Swell	Believe since Extended to CC
		New Romney, Parish Church (bel.)	1850-60 (bel.)	Matson and Sturges, of Ashford	2	Swell	
To FF	To G^3 (51 notes)	Dublin, St. Francis Xavier's	1817-28	Flight and Robson; Completed by Gray and Son	3	Swell	
To EE	To E^3 (49 notes)	*No Information*					
To EE	To F^3 (50 notes)	London, St. Edmund-the-King's, Lombard Street	1833	Bishop	3 (with a Fourth a Duplicate)	Swell	
To EE	To G^3(52 notes)	*No Information*					
To CC Short	To A^3	Freiburg (Brisgau) Cathedral, Nave Organ	1520	No information	2	Great and Choir	
To CC Complete	To A^3 (46 notes)	Amiens Cathedral (possibly)	1429 (very doubtful)	No information	3	Great, Choir, and believe Recit also	

To CC Short	To C^3	Exeter, Cathedral Choristers' School (stated)	1633-81	John Loosemore	1		Standing in 1855
		London, All Hallows', Barking (stated)	1519	Antony Duddying	1		Compass doubtful: Organ Replaced, in 1675, by One by Ren. Harris
		Vienna, St. Michael's	Very Old	No information	3	Great, Choir, and believe Echo also	
		Vienna, St. Peter's	Very Old	No information	3	Great, Choir, and believe Echo also	
To CC Incomplete	To C^3 (48 notes)	Bernau, Brandenburg; A Church (prob.) in (stated)	1570 or 6	No information	2 or More	All Manuals (bel.)	
		Breslau, St. Elizabeth's, Chief Organ	1750	Michael Engler of Silesia	3	All Manuals (bel.)	
		Breslau, St. Mary Magdalen's, Chief Organ	1725, and 1821	Joh. Röder; also Engler	3	All Manuals (bel.)	
	To C^3 (47 notes, bel.)	Florence, St. Gætano's (stated)	Believed Old	No information	3	All Manuals (stated)	
To CC Complete	To C^3 (49 notes)	Frankfort-on-Main Cathedral	1620 (abt.)	Meyer	2	Great and Choir	
		Genoa, Carignano Church	1649	Hermann (a Jesuit)	3	Echo or Swell	Organ Reconstructed, by Serassi, about 1859

To CC Complete	To C^3 [Continued] (49 notes)	Genoa, St. Ambrogio's	1648	Hermann (Jesuit)	2	Swell	Organ Enlarged, by Giuliani, about 1854
		Ratisbon, St. Emmeran's	1605 (abt.)	No information	2	Great and Choir	
		St. David's Cathedral	No exact record	Father Smith (his original Range)	2	Great	Extended to F^3, by Lincoln, abt. 1845
		's Hertogenbosch or Bois-le-Duc, Cathedral (bel.)	1580	Cornellis Hoornbeck	3	Choir and "Upper-Work"	
		Strasbourg Cathedral	1716	Andreas Silbermann	3	Great, Choir, and Echo	
To CC Complete at Bottom (bel.)	To D^3 without $C\sharp^3$ (50 notes, bel.)	Cologne, Minorets' Church	1455 (stated, but very doubtful)	No information	2	Great and Choir	Probably Date given is not that of the actual Compass
To CC Complete	To D^3 (51 notes)	Dresden, Royal Catholic Church	1754	G. and J. D. Silbermann	3	Great, Choir, and Echo	
		Dresden, Sta. Sophia's	1722 (bel.)	Gottfried Silbermann	2	Great and Choir	
		Geneva Cathedral	1705 (abt.)	Gerger	4	Great and Positif (Choir)	Organ entirely Rebuilt, by Merklin, in 1865
		Haarlem Cathedral	1735-8	Christian Müller of Amsterdam	3	Great, Choir, and Echo	Believe Organ remains Unaltered
		Katscher (*qy.*, Ratscher, near Ratibor) Catholic Church	1843	Müller, *Senior* (of Breslau, bel.)	2	Great and Choir	

To CC Complete	To D^3 [Continued] (51 notes)	Soleure Cathedral	1790	Bossart de Zug	3	Great, Choir, and Echo	
		Stuttgard, Stiftskirche (Collegiate Church)	1737	Martin of Hayengen	4	All Manuals	Organ since Repaired and Enlarged, by Walcker
		Vienna Cathedral	Very Old	No information	2	Great and Choir	Large New Organ Ordered in 1883
To CC Short	To E^3	Lucerne "Cathedral," (Collegiate Church)	1634-51	Geisseler of Salzbourg	3	Great, Choir, and Echo	Organ Rebuilt, by Haas, in 1862
To CC Complete	To E^3 (53 notes)	Bristol, St. James's	1824	Smith of Bristol	4 (One chiefly Borrowing)	Great, Choir, and Inside (Bor.) Choir	
		Durham Cathedral	1815	England, *Junior*; also Nicholls	3	Great only (stated)	Organ since Replaced by a Larger One
		Shrewsbury, St. Mary's (bel.)	1729	Harris and Byfield	3	Great and Choir	Organ Enlarged, by Gray and Davison, in 1847
To CC Short	To F^3	Vienna, Minorets' Church	Very Old	No information	2	Great and Choir	Organ Renovated, by Deutschmann, about 1853

To CC Incomplete	To F^3 (53 notes)	Leominster, *Mr. M. Bradley's* Organ. (Key was present)	Old	As Rebuilt by J. Watson Warman	2	Swell	Organ since Removed to Heckmondwike, Yorks.
To CC Complete	To F^3 (54 notes)	Abbeville, St. Wolfran's	1845 or earlier	Charles Lefevre (prob.)	4; One being for the *Pedale*	Great, Choir, and *Pedale-Manual*	
		Amiens, St. Remy's	1842	Monks of St. Basil	3	Great and Choir	
		Antwerp Cathedral	1645, and 1834	De la Haye of Antwerp; Repaired (and prob. Swell added) by Folder	3	Great, Swell, and Choir	
		Beauvais Cathedral	Before 1855	No information	5	Great, Swell, Choir, Bombarde, and Recit-Echo (Swell-Echo)	
		Birmingham Town Hall	As Remodelled in 1840 to 1854	William Hill	4 (One Borrowing)	Great, Swell, Choir, and Borr.-Solo	
		Constance Cathedral	1518	No information	2	Great and Choir	Probably since Extended Upwards
		Ely Cathedral	1851	Hill	3	Great and Choir	No Upward Extension since

To CC Complete	To F^3 [Continued] (54 notes)	Frankfort (On-Main, bel.), St. Paul's	1855 (abt.)	Walcker of Ludwigsburg	3	Great, Choir, and Echo	
		Fribourg (Switzerland) Cathedral	1834	Aloise or Aloys Mooser, of Fribourg	4	Great, Choir, Positif, and Echo	Two Swell-Boxes, etc., Added, by Merklin, in 1872; but Compass not Extended
		Gloucester Cathedral	1847	Henry Willis	3	Swell	
		Leeds, Brunswick Chapel	1827-37 (bel.)	Booth of Wakefield	3	Swell	
		Leeds, St. Peter's Chapel	1827-37 (bel.)	Booth of Wakefield	3	Swell	
		Loitz, Pomerania; Marien-Kirche	1840-55 (bel.)	Johann Frederic Schulze	2	Great and Choir	
		London, Christ Church, Spitalfields	1852	Gray and Davison	3	Swell	Organ since Enlarged
		London, St. James's, Piccadilly	1852	As Rebuilt by Bishop	3	Great, Swell, and Choir	Organ Improved in 1866
		London, St. Luke's, Old Street	1844	Gray and Davison	3	Great, Swell, and Choir	Organ Enlarged in 1862
		London, St. Mary's, Clapham	1845	J. C. Bishop	3	Great, Swell, and Choir	
		London, St. Olave's, Southwark	1844-6	Lincoln; "Perfected" by Hill	2	Great	
		London, Westminster Abbey	1848	Hill	3	Swell	A Solo Section since Added

To CC Complete	To F^3 [Continued] (54 notes)	Lyons Cathedral	1875	J. Merklin	3	Great, Swell, and Choir	
		New York, Church of the Annunciation	1853	George Jardine	3	Great, Swell, and Choir	
		New York, Trinity Church	1825-50	Henry Erben	3	Choir	
		Newark-on-Trent, Parish Church	1853 (abt.)	Forster and Andrews	4	Great and Swell	
		Organ for the late *S. Wesley* (bel.)	1812 (abt.)	Elliott	No information		A Chamber Organ
		Paris, Church of the Madeleine	1846	Cavaillé-Coll	4	Great, Bombarde, Swell, and Choir	
		Rotterdam, Octagon Church	1850	Batz of Utrecht	3	Great, Swell, and Choir	
		St. Denis, near Paris; Abbey	1841	Cavaillé-Coll	3 (4 *Sections*)	Great, Bombarde, Swell, and Choir	
		South Shields, St. Hilda's	1866	T. C. Lewis and Co.	3	Great, Swell, and Choir	
		Ulm Cathedral (bel.)	1854 to 6	Walcker and Schulze, Combined	4 (One Borrowing)	Great, Swell, Choir, and Borr.-Solo	
		Worcester Cathedral, Choral Organ	1842	Hill and Co.	3	Great and Choir	

To CC Complete	To G^3 (56 notes)	Gloucester Shire Hall	1849	Nicholson of Worcester	3	Great and Swell	
		Kronstadt or Cronstadt, Cathedral	1839	Buchholz of Berlin (Designed)	4	Great, Echo, Choir, and "Reed-Work"	
		London, Exeter Hall	1839	J. W. Walker of London	3	Swell	
		London, St. Martin's-in-Fields, Charing Cross	1854	Bevington	3	Great, Swell, and Choir	
		London, St. Michael's, Chester Square	1847	T. J. Robson	3	Great, Swell, and Choir.	Organ since Reconstructed
		Manchester, St. Peter's	1855	Kirtland and Jardine	3	Great, Swell, and Choir	
		New York, First Presbyterian Church	Before 1855	George Jardine	3	Great, Swell, and Choir	
		Radley, near Oxford; College	1838-55	Telford of Dublin	3	Great, Swell, and Choir	
		Seville Cathedral, Largest Organ	Apparently rather Old	No information	3	Great, Forte-de-Echo, and Echo	
To CC Complete	To A^3 (58 notes)	Bombay, India; Town Hall	1872	Bishop and Starr, London	3	Great, Swell, and Choir	
		Brighton, Pavilion Dome	1868 (bel. abt.)	Willis	4	Great, Swell, Choir, and Solo	

To CC Complete	To A^3 [Continued] (58 notes)	London, Panopticon, Leicester Square	1853	Hill and Co.	4	Great, Swell, Choir, and Solo	Organ Removed in 1874 from *St. Paul's Cathedral* to Clifton, Bristol
		London, St. Martin's Hall	1855	Hill and Co.	3	Great and Choir	
To CC Complete	To C^4 (61 notes)	Cincinnati, Music Hall	1878	Hook and Hastings, Boston	4	Great, Swell, Choir, and Solo	
		Garden City, New York; Cathedral of the Incarnation	1882	Hilborne L. Roosevelt of New York	4 (5 *Sections*)	Great, Swell, Choir, Solo, and Echo	
		Genoa, Church of Carmine	1877-8	C. G. Bianchi of Genoa	2	Great, and Swell or other Second Manual	
		Glasgow City Hall	1853	Gray and Davison	3	Great, Swell, and Choir	
		Huddersfield, Buxton Road Chapel	1847-55	T. J. Robson	3	Great, Swell, and Choir.	
		London, Albert Hall	1870-2	Willis	4	Great, Swell, Choir, and Solo	
		London, Foundling Hospital	1855	Bevington	3	Great, Swell, and Choir	
		Melbourne Town Hall	1872	Hill and Son, London	4	Great, Swell, Choir, and Solo	

To CC Complete	To C^1 [Continued] (61 notes)	Milan, St. Alessandro's	Before 1855	No information	2	Swell	
		Rome, St. Peter's, Proposed Organ	1875	Cavaillé-Coll	5 (6 *Sections*)	Great, Great-Choir, Bombarde, Positif, Recit (Swell), and Solo-Recit	
		Sheffield, Music Hall	1873	Cavaillé-Coll	4	Great, Swell, Choir, and Solo	
		York Cathedral, Chief Organ	1829	Elliott and Hill	4	Swell and "Tuba" (Solo)	Shortened to G^3 in 1859 or 1864
To AA Complete	To F^3 (57 notes)	Paris, St. Sulpice's	1776-81	C. Dallery and F. Cliquot	5	Great, Choir, Bombarde, Recit, and Echo	Manuals Reduced, by Cav.-Coll, to 4, in 1845
To AA Complete	To G^3 (59 notes)	Paris, Chapel of the Tuileries	1853	As Rebuilt by P. Erard and Cav.-Coll	3	Great, Swell, and "Touch-Expressive"	
To AA Complete	To A^3 (61 notes)	*No Information*					
To AA Complete	To C^4 (64 notes)	Seville Cathedral, Second Organ	1855, or a little before	No information	No information	All, believed	
To GG Complete	To C^3 (54 notes)	*No Information*					
To GG Short	To D^3	London, St. Botolph's, Aldgate	1676, and 1720-39	Father Smith; Choir by John Byfield, *Senior*	3	Great and Choir	Organ Rebuilt in 1867

To GG Short	To D^3 [Continued]	London, St. Peter's, Cornhill	1681	Father Smith	2	Great and Choir	Organ Rebuilt about 1840; Altered in 1867
		London, St. Sepulchre's, Snow Hill	1670	Renatus Harris	2	Great and Choir	Since Lengthened both Upwards and Downwards; Organ Rebuilt Recently
To GG Incomplete	To D^3 (55 notes)	Great Yarmouth, Parish Church	1733	Byfield, Jordan, and Bridge	3	Great and Choir	Remodelled to CC to G^3 in 1875
To GG Complete	To D^3 (56 notes)	Carlisle Cathedral	1806	Avery	3	Great and Choir	
		Durham Cathedral	1683-5	Father Smith	2	Great and Choir	Extended to E^3 in 1815
		Exeter Cathedral	1665	Loosemore of Exeter	2	Great and Choir	Organ now Altered
		Manchester Cathedral, Small Choral Organ	No exact record	Father Smith	1	Choir	Believe Organ since Removed
		Southwell Collegiate Church	1697 to 1766	Smith; Completed by Schnetzler	3	Great and Choir	
To GG Short	To E^3	London, St. Mary's, Rotherhithe	1764	John Byfield, *Junior*	3	Great and Choir	Extended to F^3 before 1855; Organ Added to in 1859

To GG Short	To E^3 [Continued]	London, St. Saviour's, Southwark	1703	Either Schreider, Schwarbrook, or Renatus Harris	3	Great and Choir	Made "Long Octaves" and Extended to F^3 in 1818; Organ Restored abt. 1840
To GG Incomplete	To E^3 (57 notes)	Canterbury Cathedral. (Key was present)	1784	Green	3	Great and Choir	All Manuals made CC to G^3 in 1879
To GG Complete	To E^3 (58 notes)	Durham Cathedral	1815	George Pike England (the *Junior*); also Nicholls	3	Choir only (stated)	Organ since Replaced by a Larger One
		Lichfield Cathedral	1789	Green	3	Great and Choir	Organ since Enlarged
		London, German Lutheran Church, Strand	1749-80	Schnetzler	3	Choir only	
		London, St. John's, Horselydown	1770	Crang and Hancock	3	Great and Choir	Organ Enlarged in 1844 and 1873
		London, St. Katherine's, Regent's Park	1778	Green	3	Great and Choir	
		London, St. Sepulchre's, Snow Hill	1854 (abt.)	Gray and Davison	3	Great, *Swell*, and Choir	Organ Rebuilt Recently
		London, St. Stephen's, Walbrook	1760 (abt.)	George England (the *Senior*)	3	Great and Choir	Organ Rebuilt in 1872
To GG Incomplete	To F^3 (58 notes)	Canterbury, St. Alphege's	1819	Goldfinch of Margate	2	Great	Organ Unaltered to 1883
To GG Complete	To F^3 (59 notes)	Gloucester Cathedral (bel.)	1847	As Enlarged by Willis	3	Choir	

To GG Complete	To F^3 [Continued] (59 notes)	Leeds, Brunswick Chapel	1827 - 37 (bel.)	Booth of Wakefield	3	Great and Choir	
		Leeds, St. Peter's Chapel	1827 - 37 (bel.)	Booth of Wakefield	3	Choir	
		London, Christ Church, Spitalfields	1852	Gray and Davison	3	Great and Choir	Organ since Enlarged
		London, St. Edmund-the-King's, Lombard Street	1833	Bishop	3 (with a Fourth Man. a Duplicate)	Great and Choir	
		London, St. Gabriel's, Pimlico	1853 (abt.)	Bevington	3	Great and Choir	
		London, St. James's, Bermondsey	1829	Bishop	3	Great and Choir	Organ Renovated in 1877
		London, St. James's Chapel Royal	1837	Hill and Davison	3	Great and Choir	
		London, St. John's, Waterloo Road	1824	Bishop	3	Great and Choir	Believe since Altered to CC
		London, Westminster Abbey	1848	Hill	3	Choir	All Manuals Remodelled to CC to A^3 in 1883-4
		London, Whitehall Chapel Royal	1814	Elliott	3 (bel.)	Great and Choir	Believe since Altered, as Organ Rebuilt in 1878
To GG Complete	To G^3 (61 notes)	Gloucester Shire Hall	1849	Nicholson of Worcester	3	Choir only	

To GG Complete	To G^3 [Continued] (61 notes)	London, Flight and Robson's *Apollonicon* (bel.)	1817	Flight and Robson	5	Chief only (the other *Four* being of but *Two* Octaves each)	Believe Organ Broken up soon after 1840
To GG Complete	To A^3 (63 notes)	Liverpool; St. George's Hall	1854 (abt.)	Willis	4	Great, *Swell*, Choir, and *Solo*	Remodelled in 1867
To FFF Complete	To C^3 (56 notes)	London, St. Paul's Cathedral, Choral Organ (bel.)	1697	Father Smith (his original Range)	2	"Chair" ("Front" Choir) only	Extended to F^3 in 1826; All Manuals made CC to A^3 in 1872
		's Hertogenbosch or Bois-le-Duc, Cathedral (bel.)	1580	Cornellis Hoornbeck	3	Great only	Pedale Added subsequently
To FFF Incomplete	To E^3 (59 notes)	Greenwich Hospital	1789	Green	3	Great and Choir	Organ Rebuilt in 1872
To FFF Complete	To E^3 (60 notes)	London, German Lutheran Church, Strand	1749-80	Schnetzler	3	Great only	
		Salisbury Cathedral	1792	Green	3	Great and Choir	Organ is now in St. Thomas's, Salisbury
To FFF Short (bel.)	To F^3 (Enharmonic)	London, Temple Church	1682, and 1843	Father Smith: Bishop	3	Great and Choir	Believe now to CC
To FFF Complete	To F^3 (61 notes)	Cambridge, St. John's College	1839	Hill	3	Great and Choir	

To FFF Complete	To F^3 [Continued] (61 notes)	London, St. Mary's R.C., Moorfields	1849-55	Bevington and Son	3	Great and Choir	
		Milan Cathedral, North Side Organ	1842	Serassi Bros., of Bergamo	1	Great	
		Newark-on-Trent, Parish Church	1804	George Pike England (the *Junior*)	3 (bel.)	Great and Choir	Great only Shortened to CC, and Solo Added, by Forster and Andrews, abt. 1853
To FFF Complete	To G^3 (63 notes)	Dublin, St. Francis Xavier's	1817-28	Flight and Robson; Completed by Gray and Son	3	Great and Choir	
		London, Exeter Hall	1839	Walker of London	3	Great and Choir	
		Milan Cathedral, South Side Organ	1842 (abt.)	Serassi Bros., of Bergamo	2	Great and Positif	
		Milan, Sta. Maria-Della-Grazia	1832	Maroni of Varasi (prob. Varese)	1	Great	
To EEE Complete	To E^3 (61 notes)	Blandford (Forum), Dorset; Church (bel.)	1794	G. P. England (the *Junior*)	No information		
To CCC Incomplete	To C^3 (59 notes, bel.)	Florence, Church of the Badia	1655 (abt.)	No information	1		
		Genoa, Church of Carignano	1649	Hermann	3	Great and Choir	Organ Reconstructed, by Serassi, abt. 1859

To CCC Incomplete	To C^3 [Continued] (59 notes, bel.)	Genoa, St. Ambrogio's	1648	Hermann	2	Great only	Organ Enlarged, by Giuliani, abt. 1854
To CCC Complete	To C^3 (61 notes)	London, Christ Church, Newgate Street (bel.)	1690	Renatus Harris	3 (bel.)	Great only (bel.)	All Manuals Remade to CC and (bel.) to F^3 abt. 1835; Organ Enlarged in 1867
		London, St. Paul's Cathedral, Choral Organ. (Not certain that Complete)	1697	Father Smith (Known to be his original Range)	2	Great only	Extended to F^3 in 1826
To CCC Incomplete	To D^3 (61 notes, bel.)	Siena or Sienna, Cathedral	Before 1855	No information	1		
To CCC Complete	To D^3 (63 notes)	Bristol, St. Mary-Redcliffe's (bel.)	1729 (prob. abt.)	Harris and Byfield	3 (bel.)	Great only (bel.)	Believe Organ since Remodelled with Shorter Great
To CCC Incomplete	To E^3 (63 notes, bel.)	Genoa, St. Felipo Neri's	Before 1855	No information	1	Great	
To CCC Incomplete	To F^3 (64 notes, bel.)	Como Cathedral, Later Organ (stated)	1650	Hermann	3	Great, Swell, and Choir (stated)	
		Como, Church of Santissimo Crocifisso	1842 (prob. abt.)	Serassi Bros., of Bergamo	2	Great and Swell	
		Rome, St. Peter's, Chief Organ	1705 (abt.)	Rebuilt and Enlarged by Priori of Rome	2	Great and [perhaps] Swell	

To CCC Complete	To F^3 (66 notes)	Birmingham Town Hall	1836	William Hill	4(One Borrowing)	Great and Choir	Shortened to CC in 1840-54
		Cambridge, Trinity College	1834	As Extended by Gray	3	Great only	Believe since Remodelled to CC
		Gloucester Cathedral	1847	As Extended by Willis	3	Great only	
		Leeds, St. Peter's Chapel	1827-37 (bel.)	Booth of Wakefield	3	Great only	
		London, Westminster Abbey	1848	As Extended by Hill	3	Great only	All Manuals Remodelled to CC to A^3 in 1883-4
		New York, Trinity Church	1825-50	Henry Erben of New York	3	Great	Believe since Remodelled
To CCC Incomplete	To G^3 (66 notes, bel.)	Florence, St. Marco's	Before 1855	No information	1	Great	
		Siena or Sienna, Conventual Church	1738 and 1845	As Enlarged by Serassi in said 1845	1	Great	
To CCC Incomplete	To A^3 (68 notes, bel.)	Milan, St. Raphael's	Before 1855	Fratelli and Prestinari, of Magenta	1	Great	
To CCC Incomplete	To C^4 (71 notes, bel.)	Genoa, Sta. Maria-des-Vignes	1842 (prob. after)	Serassi of Bergamo	1	Great	
To CCC Complete	To C^4 (73 notes)	Milan, St. Alessandro's	Before 1855	No information	2	Great only	
		York Minster (Cathedral), Chief Organ	1829	Elliott and Hill	4	Great and Choir	Shortened to CC to G^3 in 1859 or 1864

To CCC Complete	To F' (78 notes)	New York, Trinity Church (bel.)	1825-50	Erben of New York	3	Two Stops of Swell only	Believe since Remodelled

TABLE OF RANGES OF PEDAL CLAVIERS AND SECTIONS.

RANGE DOWNWARDS.	RANGE UPWARDS.	LOCATION.	DATES OF PEDAL-BOARD OR OF SECTION.	MAKERS CONCERNED.	TOTAL NUMBER OF MANUAL CLAVIERS IN THE ORGAN.	IF BREAK OR NOT AT CC OR ELSEWHERE. NATURE.	KNOWN CHANGES SINCE DATES HERE GIVEN. REMARKS.
To BB Incomplete	To Gamut B (12 notes, prob.)	Halberstadt Cathedral (bel.)	1359 or 61	Nicholas Faber	3 (stated)		Long since Altered
To AA Complete	No information	Seville Cathedral, Second Organ (bel.)	1855 or a little before	No information	No information		
To GG Incomplete	To FF	Canterbury Cathedral (bel.)	1825	James Longhurst of Canterbury	3		Since Altered
To GG Complete	To Gamut G (13 notes)	London, St. Margaret's, Westminster	1804	Avery	3	Unisons: No Break	Organ Rebuilt in 1867: Replaced by a New One in 1883
To GG Short	To Tenor C	London, St. Botolph's, Aldgate	1676, and 1720-39 or after	Father Smith; Choir by John Byfield, *Senior*	3	(No Pipes)	Organ Rebuilt in 1867

To GG Incomplete	To Tenor C (17 notes)	Canterbury, St. Alphege's	1819	Goldfinch	2	(No Pipes)	Organ Unaltered to 1883
To GG Complete	To Tenor C (18 notes)	Hunton Bridge, near Watford; Church	1864 (abt.)	Added by Hill	2	Doubles: No Break	
		London, St. Dunstan's, Fleet Street	1834	T. R. Robson	3	Doubles: No Break	Board Extended to CCC, by Holdich, in 1876; and the Doubles retained by means of a Sub-Octave Coupler
		London, St. Edmund's, Lombard Street	1833	Bishop	3 (with a Fourth Man. a Duplicate)	Doubles: No Break	
		London, St. Katherine's, Regent's Park (bel.)	1778 or after	Green	3	Break at BB-CCC	
		London, St. Leonard's, Shoreditch	1757 or thereabouts	Bridge	3	(No Pipes)	Organ Repaired in 1870
		London, St. Saviour's, Southwark	1818	Davis	3	Doubles: No Break	Believe since Altered to CCC
		London, St. Stephen's, Walbrook	1760 (abt. or after)	George England *(Senior)*	3	Unisons: No Break	Organ Rebuilt in 1872
		Wells Cathedral	1830	Smith of Bristol	3	Doubles: No Break	

To GG Complete	To Tenor D (20 notes)	Halifax (Yorkshire), Parish Church	1836	Gray	3	Doubles: No Break	
		Rochester Cathedral	1835	Hill (bel.)	3	Break at BB-CCC	Claviers Altered to "C" in 1875; but Pipes remain as before
To GG Complete	To Tenor E (22 notes)	*No Information*					
To GG Complete	To Tenor F (23 notes)	*No Information*					
To GG Complete	To Fiddle G (25 notes)	Canterbury Cathedral. (Pipes one Octave only,—"C" to "C")	1841-2	Hill	3	Return by Action BB-CCC	Pedal-board of CCC to Tenor F Substituted in 1879
		Canterbury, Wesleyan Chapel, St. Peter's Street	1846 (abt.)	H. Jones, London	2	Break at AA♯-BBB. (Open Pipes below the Break, and Stopt Pipes above it)	Organ made a "C" in 1876
		London, Flight and Robson's *Apollonicon* (bel.)	1817	Flight and Robson	5		Believe Organ Broken up soon after 1840
		London, St. Gabriel's, Pimlico	1853 (abt.)	Bevington	3	Break at BB-CCC	

To GG Complete	To Fiddle G [Continued] (25 notes)	London, St. James's, Bermondsey	1829 or after	Bishop	3 (besides a Duplicate Clavier for the Pedale)	Doubles: No Break	Organ Renovated in 1877
		London, St. Luke's, Chelsea	1794 or after	Nichols; Completed by Gray	3	Break at BB-CCC	Organ since Added to
		Nottingham, St. Mary's	1749-80 or after	Schnetzler	3	Break at BB-CCC	Organ Rebuilt as a "C" in 1871
To GG Complete	To Middle D^1 (32 notes)	Paris, Chapel of the Tuileries (stated). (Pipes up only to Tenor C,—18 notes)	1853	As Rebuilt by P. Erard and Cavaillé-Coll	3		
To GG Complete (prob.)	To Middle E^1 (partly; probably not the *Clavier* in this case)	London, Christ Church, Spitalfields	1837 or after	Lincoln	3	Doubles also: No Break at CCC	Organ since Enlarged
To FFF Complete	To FF (13 notes)	*No Information*					
To FFF Complete	To Gamut G (15 notes)	*No Information*					
To FFF Complete	To Gamut A (17 notes)	Milan, Sta. Maria-Della-Grazia	1832	Maroni (prob. of Varese)	1	Believe no Break	
To FFF Complete	To Gamut B (19 notes)	Milan Cathedral, South Side Organ	1842 (abt.)	Serassi Bros.	2	Believe no Break	

To FFF Complete	To Tenor C (20 notes)	Chichester Cathedral	1844	Gray and Davison	3	Doubles: No Break	
		Greenwich Hospital	1789 (not certain)	Green (not certain)	3	Break at BB-CCC	
		London, German Lutheran Church, Strand	1749-80 (prob.)	Schnetzler	3	(No Pipes)	
		London, St. Mary's R. C., Moorfields	1849-55	Bevington and Son	3	Doubles: No Break	
		London, Temple Church	1843	Bishop	3	Return by Action BB-CCC	Replaced by a Board of CCC to Tenor F before 1855
		Milan Cathedral, North Side Organ	1842	Serassi Bros.	1	Believe no Break	
To FFF Incomplete	To Tenor D (21 notes)	London, Whitehall Chapel Royal (bel.)	1844	Hill and Son	4	Unisons: No Break	Believe since Remodelled to CCC
To FFF Complete	To Tenor E (24 notes)	*No Information*					
To FFF Complete	To Tenor F (25 notes)	Amiens, St. Remy's	1842	Monks of St. Basil	3	Believe no Break	
		Antwerp Cathedral	1645, and 1834	De-la-Haye; Repaired by Folder of Brussels	3	Believe no Break	
		Beauvais Cathedral	Before 1855	No information	5	Believe no Break	

To FFF Complete	To Tenor F [Continued] (25 notes)	Dublin, St. Francis Xavier's	1817-40	Flight and Robson; Completed by Gray and Son	3	Doubles: No Break	
		St. Denis, near Paris; Abbey	1841	Cavaillé-Coll	3 (4 *Sections*)	11 Pedale Stops — 3 of them Doubles — without a Break	
		Salisbury Cathedral	1792 (not certain)	Green (not certain)	3	Break at BB-CCC	Organ is now in St. Thomas's, Salisbury
To CCC Complete	To CC (13 notes)	Frankfort-on-Main Cathedral	1620 (abt.)	Meyer	2		
		Freiburg (Brisgau) Cathedral, Nave Organ	1520 or later	No information	2		
		Genoa, St. Felipo Neri's (bel.)	Before 1855	No information	1		Possibly Incomplete; but is not so stated
		Manchester, St. Luke's	1840	Hill	3		
		Seville Cathedral, Largest Organ (bel.)	Apparently rather Old	No information	3		
To CCC Incomplete	To DD (13 notes, bel.)	Florence, Church of the Badia	1655 (abt.)	No information	1	(No Pipes)	
To CCC Complete	To EE (17 notes)	Cologne, Minorets' Church	1455 (stated)	No information	2		
To CCC Incomplete	To FF (16 notes, bel.)	Florence, St. Marco's	Before 1855	No information	1	(No Pipes)	

To CCC Incomplete	To FF [Continued] (16 notes, bel.)	Siena or Sienna, Cathedral. (Pedale has Chief Stop down only to AAA note; and one of 16 feet down only to AA note)	Before 1855	No information	1		
To CCC Complete	To FF (18 notes)	Botzen, Tyrol; Parish Church	Before 1855	Hess; Repaired by Carlo Mauracher	2		
		Cologne, Jesuits' Church	1750; Enlarged in 1822	No information	3		
To CCC Complete	To Gamut G (20 notes)	Coblentz, Church of Castor	Before 1855	No information	3		
		Constance Cathedral	1518 or later	No information	2		
		Freiburg (Brisgau), Lutheran Church	1555 (abt. or later)	No information	2		Organ Repaired abt. 1854
To CCC Short	To Gamut A	Vienna, Minorets' Church	Very Old (stated)	Organ Renovated by Deutschmann of Vienna	2		Organ Renovated abt. 1853
		Vienna, St. Michael's	Very Old (stated)	No information	3		
		Vienna, St. Peter's	Very Old (stated)	No information	3		
To CCC Complete	To Gamut A (22 notes)	Cologne, Sta. Maria-de-Capitol	1767	Ludwig König of Cologne	3		
		Ratisbon, St. Emmeran's	1605 (abt.)	No information	2		
		Soleure Cathedral	1790	Bossart de Zug	3		

To CCC Complete	To Gamut A [Continued] (22 notes)	Vienna, Lutheran Church	1853 (prob. abt.)	Deutschmann of Vienna	2		
To CCC Complete	To Gamut B (24 notes)	Shoreham, Sussex ; St. Peter's R.C.	1882	H. Jones and Co.	No information		
To CCC Short	To Tenor C	Lucerne "Cathedral" (Collegiate Church)	1634-51 or later	Geisseler of Salzbourg	3		Organ Rebuilt, by Haas, in 1862
To CCC Incomplete	To Tenor C (23 notes, bel.)	Florence, St. Gætano's	Before 1855	No information	3		
		Genoa, St. Ambrogio's	1648 or later	Hermann	2	(No Pipes)	Organ Enlarged, by Giuliani, abt. 1854
		Genoa, Sta. Maria-des-Vignes	1842 (prob. after)	Serassi Bros.	1		
		Milan, St. Raphael's	Before 1855	Fratelli and Prestinari	1		
		Rome, St. Peter's, Chief Organ	1705 (abt.)	Enlarged by Priori of Rome	2		
		Siena, Conventual Church. (Pedale Chief Stop down only to AAA note)	1738, and 1845	As Enlarged by Serassi in said 1845	1		
To CCC Complete	To Tenor C (25 notes)	Chester, St. John's	Sometime before 1855	Hill	3		
		Cologne Cathedral	1845 (abt.)	As much Enlarged by Maas of Cologne	3		

To CCC Complete	To Tenor C [Continued] (25 notes)	Dresden, Royal Catholic Church	1754	G. and J. D. Silbermann	3		
		Dresden, Sta. Sophia's	1722 or abt.	Gottfried Silbermann	2		
		Fribourg (Switzerland) Cathedral	1834	Aloise or Aloys Mooser	4	(2 Pedales)	The two Pedales made, by Merklin, into one, in 1872; but Compass *not* Extended
		Geneva Cathedral	1705 (abt.)	Gerger	4		Organ entirely Rebuilt, by Merklin, in 1865; and Range Extended to Tenor D
		Görlitz, S.S. Peter and Paul's	1697-1703	E. and A. H. Casparini (Father and Son)	3		
		Gouda, St. John Baptist's	1736	Moreau	3		
		Leeds, Brunswick Chapel	1827-37 (bel.)	Booth	3		
		London, St. Mary's, Clapham	1845	J. C. Bishop	3		Believe since Extended Upwards
		London, St. Paul's Cathedral, Choral Organ	1849	Bishop	3		Extended to Tenor F in 1872
		Milan, St. Alessandro's	Before 1855	No information	2		

To CCC Complete	To Tenor C [Continued] (25 notes)	New York, Trinity Church	1825 - 50	Henry Erben	3		Believe since Remodelled
		Paris, Notre Dame, Choral Organ	1863	J. Merklin	2		
		Paris, St. Vincent-de-Paul's	1840 - 55	Cavaillé-Coll	3		
		Rouen, St. Ouen's (bel.)	1630 or later	No information	5		
		Strasbourg Cathedral	1716	Andreas Silbermann	3		
		Vienna Cathedral	Very Old	No information	2		Large New Instrument Ordered in 1883
		York Minster (Cathedral), Chief Organ. (Might be really called *CCCC* to *CC*, as 4 *Thirty-twos* to 4 *Sixteens*, and no Stop higher than latter)	1829	Elliott and Hill	4		Remodelled to CCC to Tenor F in 1859 or 1864
To CCC Incomplete	To Tenor D (26 notes)	Bernau, Brandenburg, a Church (prob.) in (stated, but *very* doubtful)	1570 or 6	No information	2 or More		
		Breslau, St. Mary Magdalen's, Chief Organ	1725, and 1821	J. Röder of Berlin; also Engler	3		
	To Tenor D (25 notes, bel.)	Como Cathedral, Later Organ	1650 or later	Hermann	3		Ped.-board probably Later than Date given

To CCC Incomplete	To Tenor D [Continued] (25 notes, bel.)	Genoa, Carignano Church. (Pedale Chief Stop down only to AAA note)	1649, and 1859 (abt.)	Hermann	3		Organ Reconstructed, by Serassi, about 1859
To CCC Complete	To Tenor D (27 notes)	Ely Cathedral	1851	Hill	3		Enlarged and Extended to Tenor E in 1867
		Frankfort (On-Main, bel.), St Paul's	1855 (abt.)	Walcker of Ludwigsburg	3	(2 Pedales)	
		Genoa, Church of Carmine	1877-8	C. G. Bianchi of Genoa	2		
		Haarlem Cathedral	1735-8	Müller of Amsterdam	3		Believe Organ remains Unaltered
		Katscher, Catholic Church	1843	Müller *Senior* (of Breslau, bel.)	2		
		Leominster, Parish Church,—bel. (No Pipes to Lowest G♯)	1840-65	Walker; also Nicholson of Worcester	3	Return by Action below GG Pedal	
		Loitz, Pomerania; Marien-Kirche	1840-55 (bel.)	J. F. Schulze	2		
		London, Wesleyan Chapel, Poplar	1847	Hill	3		
		Lyons Cathedral	1875	J. Merklin	3		
		Paris, Church of the Madeleine	1846	Cavaillé-Coll	4		

To CCC Complete	To Tenor D [Continued] (27 notes)	Paris, St. Sulpice's	1776-81	Dallery and Cliquot	5		Manuals Reduced, by Cavaillé-Coll, to 4, in 1845
		's Hertogenbosch or Bois-le-Duc, Cathedral (possibly)	No information	Pedale is a Subsequent Addition	3		Upward Range is Uncertain
		Springfield, Mass., U. S.; North Congregational Church	1873	Johnson and Co., Massachusetts	2		
		Stuttgard, Stiftskirche	1737	Martin of Hayengen; Enlarged by Walcker	4	(2 Pedales)	
		Ulm Cathedral (bel.)	1854 to 6	Walcker and Schulze Combined	4 (One Borrowing)	(2 Pedales)	
To CCC Incomplete	To Tenor E (28 notes)	Breslau, St. Elizabeth's, Chief Organ	1750 or later	Engler of Silesia	3		
To CCC Complete	To Tenor E (29 notes)	Breslau, Cemetery Church	Before 1855	No information	2		
		Breslau, University Music Room	Before 1855	No information	2		
		Gloucester Cathedral	1847	Willis	3		
		London, Exeter Hall	1839	Walker of London	3		
		London, St. James's, Piccadilly	1852	As Rebuilt by Bishop	3		Organ Improved in 1866

To CCC Complete	To Tenor E [Continued] (29 notes)	London, St. Luke's, Old Street	1840-55	Gray and Davison	3		Organ Enlarged in 1862
		London, St. Mary-at-Hill's, Eastcheap	1849	Hill and Co.	2		Organ since Added to
		New York, Church of the Annunciation	1853	Jardine of New York	3		
To CCC Complete	To Tenor F (30 notes)	Abbeville, St. Wolfran's (sometimes called Cathedral)	1845 (prob.)	Charles Lefevre (prob.)	4; One being for the *Pedale*	(United F to *Pedale - Manual)*	
		Birmingham Town Hall	1836-54	Hill	4 (One Borrowing)		
		Cincinnati, Music Hall	1878	Hook and Hastings, of Boston	4		
		Garden City, New York; Cathedral of the Incarnation	1882	H. L. Roosevelt	4 (5 *Sections*)		
		Geneva, a Church in	1830 (prob. abt.)	Mooser	2		
		Gloucester Shire Hall	1849	Nicholson of Worcester	3		
		Leominster, *Mr. M. Bradley's* Organ. (Pipes up only to BB Key,—12 notes)	1866	J. Watson Warman	2	No real Break	Organ since Removed to Heckmondwike, Yorks.

To CCC Complete	To Tenor F [Continued] (30 notes)	Liverpool, St. George's Hall	1854 (abt.)	H. Willis	4		
		London, Foundling Hospital	1855	Bevington	3		
		London, St. Martin's-in-Fields, Charing Cross	1854	Bevington	3		
		London, St. Michael's, Chester Square	1847	T. J. Robson	3		
		London, St. Sepulchre's, Snow Hill	1854 (abt.)	Gray and Davison	3		
		London, Temple Church. (Pedale Chief Stop down only to FFFF note)	1848-55	Robson	3		
		Manchester, St. Peter's	1855	Kirtland and Jardine, of Manchester	3		
		New York, First Presbyterian Church	Before 1855	Jardine of New York	3		
		Philadelphia, U. S.; Centennial Exhibition of 1876. (Pipes Continued up to F¹ for Super Octave Coupler)	1876	Hook and Hastings	4		Organ is now in Buffalo Cathedral
		Rome, St. Peter's, Proposed Organ	1875	Cavaillé-Coll	5 (6 *Sections*)		

To CCC Complete	To Tenor F [Continued] (30 notes)	Rotterdam, Octagon Church	1850	Batz	3			
To CCC Complete	To Fiddle G (32 notes)	Kronstadt or Cronstadt, Cathedral	1839	C. Buchholz (Designed)	4			
		Lincoln Cathedral. (Chorus and Reed Five of the seven Pedale Stops up only to FFF♯ Key, — 7 notes)	1851	Charles Allen	3			
		Liverpool, Collegiate Institution	1850	Jackson of Liverpool	3			
		London, Albert Hall	1870-2	Willis	4			
		London, Christ Church, Marylebone	1825 (stated)	Bishop	3			
		London, Christ Church, Newgate Street. (Pipes up only to CC Key,—13 notes)	1835 (abt.)	Hill	3			
		Radley, near Oxford; College	1838-55	Telford	3			

It is not necessary to furnish a regular *Analysis* of the foregoing Table, for the reader will be easily able to do this for himself; besides which, some of the Instances contained are rather of Historical than of real practical value. But a few REMARKS on the several Chief different Ranges presented are certainly called for: these will now be given, together with one or more Instances that it has *not* seemed worth while to include in the Table itself.

It is to be first observed, that not only in this Table, but throughout the entire present *Division*, the Citations have been of *Earlier* rather than of *Later* Instances. This is because the former are—manifestly—of the greater *Interest* of the two.

MANUALE.—For constituting the DOWNWARD Limit of the Manuale, one Note, viz., *D*, appears *never* to have been employed. Of all of the remaining Six, one or more Instances will be found in the Range Table. The following affords an Outline of them, so far as respects the CHIEF Manuale.

Gamut B.—The Downward Compass of the Manuale seems to have reached, Definitely and Chromatically, as low as Gamut B by the Year 1361: see the Halberstadt Cathedral Organ. With the exception of this, and of the Instrument at Magdeburg (for which also see the Table), there are few, if any, Organs of B Range of which an authentic account has come down to us; and even these have, naturally, long since been altered or replaced. It is to be observed that *Rimbault*, on page 42 of his *History* (see at the end of the present *Department*) wrongly makes the Manuals of the Halberstadt Instrument to have descended to *BB*, and yet to have risen to A^1, thus extending one octave over the Compass as stated in the remaining part of his same Description. The said BB was doubtless the Range of the *Pedale*, which Section we know to have been existent before the time of *Prætorius*,—from whose account Rimbault's description was derived.

CC.—This is the Note *most widely diffused* as the Lower Boundary of the Manuale. It furnishes the present regularly recognised Manual Range in *America*, *Austria*, *Germany*, the *Netherlands*, *Prussia*, *Russia* with *Poland*, and *Switzerland*: and in all these Countries it appears to have been rarely or never departed from after its first adoption,—at probably the end of the Fifteenth Century in several of them. In *France*, the CC Manuale Bottom has been *all but* invariably adhered to from about the aforesaid date; and may be regarded as now completely established. In *Spain*, the Range has been to some extent employed for a considerable time (see the Seville Cathedral Largest Organ); and is now, I believe, becoming accepted almost uniformly. In *Italy*, the CC Manuale Boundary has formerly been occasionally adopted (see at St. Gaetano's, Florence); and, during the last few years, has become—partly owing to advocacy by the present writer—recognized more frequently (see at the Church of Carmine, Genoa). In the *British Islands*, the CC Manuale has been sometimes used in the past (as, seemingly, at Exeter Cathedral Choristers' School, and perhaps at All Hallows', London); and is now accepted exclusively: besides which a very large number of existing English Instruments have been either entirely (as at Christ Church, Newgate Street, London) or partially (as at Newark-on-Trent Parish Church; see, in the Table, under FFF) *Re-modelled* to this Note. [*Hopkins*, writing in 1854-5, states that there were then between 300 and 400 English Organs having "C" Claviers.] In the *British Colonies*, few, if any, Chief Manuals of other than CC Compass have ever existed, the regular recognition of the "C" Boundary by the Mother Country having occurred *soon* enough for this note to have been adopted in most of the *first* Colonial representative Instruments constructed.

In the *Rochester Cathedral* Organ, as partially Re-modelled by J. W. Walker in 1875, the GG Manuals were replaced by others descending only to CC: but the *Soundboards* and *Pipes* of the Great and Choir Sections (the Swell went only to Tenor C) remained as before; and the notes below CC were made available by the introduction of two special *Couplers*, one of them giving the "Great Sub-Octave on Itself," and the other, the "Choir Sub-Octave on Itself."

AA.—This Note has been rarely used as a Manual Bottom. The only real Instances that I have been able to discover are,—at St. Sulpice's, Paris; in the Chapel of the Tuileries, Paris; and the Second Organ in Seville Cathedral (see again in the Table of Ranges). Observe, however, the nondescript CC Manual with AA on its apparent CC♯, which is mentioned at some distance back under Division *Short and Incomplete Octaves.*

GG.—Here we have the Note which, in Alternation with *FFF*, furnished the regular and nearly invariable Chief Manual Bottom throughout the *British Islands* during a period extending from 1665 (see at Exeter Cathedral) to about 1854 (see at Liverpool St. George's Hall). GG *Short Octave* Manuals, however, were existent in England at some time before this if the given date of a *Painting* at *Holyrood Palace*, representing St. Cecilia playing upon an Organ, can be relied on. This picture exhibits quite clearly the bottom Keys of a Short-Octave GG Manual; and it is stated to have been painted during about the End of the Fifteenth Century. At this point see a little forward, under Side-Head PEDAL-BOARD, for the Instruments in Gloucester Shire Hall and Durham Cathedral.

GG, as a Manual Bottom, is, as will have been observed, virtually *confined* to Great Britain and Ireland.

FFF.—This Manual Range has just been mentioned as having been the British Alternative of the GG. FFF, however, has not been so *much* used in *England* as GG has, but, as a compensation, has spread more than has the latter,—FFF Manuals being sometimes met with in *Italy*, and, though more rarely, in the *Netherlands*. The Dates extend from 1580 ('sHertogenbosch Cathedral) to about 1852 (St. Mary's R. C., Moorfields, London). See again a little onward under Heading PEDALE-BOARD, for the Organs in the German Lutheran Church and Newark Parish Church.

EEE.—This is a very rare Compass indeed. I have been able to discover only one Instance,—this being English.

CCC.—In this Note we have the until lately regularly recognized *Italian* Chief Manual Range. It has also been so employed occasionally in England; and, in a very few cases, in America. The Dates cover from 1650 (see Como Cathedral Second Organ) to about 1848 (see Westminster Abbey Organ).

....

Concerning the DOWNWARD Limit of the REMAINING Manuale, the Table of Ranges will show, that in Continental Instruments, such Limit is and has been generally the *same* as that of the Chief Manuale, *except* when such "Chief" descends to CCC (as at St. Alessandro's, Milan); and is sometimes so even then (see Como Cathedral Later Organ). When the Secondary Manuals do not extend so low as CCC, they usually finish on CC. For an exception to this last see the Geneva Cathedral Organ, which had its Echo and Recit stopping at Middle C and Fiddle G respectively: here, however, the Chief Manuals went only to *CC*.

But in Great Britain the Compass of the Secondary Manuale appears to have been definitely set at *Middle C* at the time, viz., about 1682 (see the London Temple Church Organ), when such Short Key-boards became first applied. From this note such Secondary Manuale Range Bottom descended gradually and regularly—first as the Echo, then as the Swell—through Fiddle G, Tenor F, Tenor E, Tenor C, Gamut G, FF, and—by the year 1833—EE, until, finally, about 1840, or soon after, it settled on CC. Both Tenor D and DD seem to have been wholly avoided as Bottoms. (During the latter part of the same period commenced the Shortening of the Great and the Choir Manuals to the aforesaid and so *correspondent* CC). And thus has the Secondary Manuale Compass remained until the present time (1883), all the Manual Sections being now carried down to one same note except in cases where space or funds are so deficient as to necessitate the *Swell's* being shorter than CC. As partially an exception to the foregoing, note the Tenor C *Solo* Section of the already cited Newark Church Instrument.

....

We have now to Remark on the UPWARD Limits of the Instances of Manuale Range;—first, however, pointing out, that it is so generally and so advisably the fact that all Organs which possess more than One Manual do have the tops of all their Manuals terminating on one *same* note, that, in the Observations now to be made, such Sameness is to be always assumed, unless the contrary be directly expressed.

In the Journal *Musical Opinion* (see at end of the present *Department*), for Feb. 1881, it is—though quite improbable—stated positively that by the End of the Fifteenth Century the Manuals had, in Foreign Organs, attained a Compass of Four Octaves: and, as the Downward Limit of these Claviers would (as we have already seen) most likely be CC, it must follow that their Upward Range would be, accordingly, to C^3. In the *Table* of Ranges there has been given one Instance (at All Hallows', London [see under CC, Short]) of C^3 being employed during at any rate as early as 1519; but even this case is doubtful, see further under Division *Origin and Introduction*, at some little way onward. The Table will be found to cite also the *Amiens Cathedral* Organ, as Ascending [from CC] to A^2 in 1429; which would appear to almost demonstrate that C^3 was regularly settled upon in *France* at so early as, say, 1529: but this Instance likewise must be received with considerable caution. *Dr. Rimbault*, on page 56 of his already mentioned *History*, implies that C^3 was undoubtedly in general use for the Manuale by the End of the *Sixteenth* Century; and the Table seems to afford reliable evidence of this,—as in the Bernau Church Organ, extending [from CC, Incomplete] to C^3 in 1570 or 76 (this is partly quoted from Rimbault on page 156 of *Hiles's Catechism;* see again at end of the present *Department*). It appears certain that *Germany proper* attained to A^2 in 1520 (see [under CC, Short] the Freiburg in Brisgau Cath., Nave Org.), and so to C^3 during about 1620 (see [under CC] at Frankfort-on-Maine Cath.). *Italy* seems not to have reached C^3 until 1648 see [under CC] at St. Ambrogio's, Genoa).

The next Step above C^3 was of course soon taken. The Table of Ranges will be seen giving (under CC,) D^3 as having been attained, in the *Minorets' Church* Organ at *Cologne*, at as long ago as 1455,—actually earlier than the *oldest* of the dates just stated for C^3: but the date of this Instance must be regarded as doubtful in the extreme. The Table may, however, be considered to demonstrate it a fact that in *Great Britain*—passing over the Exeter Cathedral Instrument, the Upward Compass of which seems rather uncertain —the Organ Manual had definitely reached as high as D^3 during 1670 (see [under GG, Short] at St. Sepulchre's, Snow Hill, London); though C^3 continued to be at the same time, and until 1695-7 (see [under FFF] at St. Paul's Cathedral), also used by Builders in England.

Forward from the Dates just named, the Upward Compass of the Manuale has *continuously Ascended*, Natural by Natural, until now; at which time it may be considered to stand, in all advanced Countries, at A^3, with C^4 for Concert Organs, and G^3 only in less important Instruments. In this Ascension, as will be seen by a glance at the corresponding [CC] portions of the Table, Great Britain has been, from the first, rather in the Lead. The C^4 Boundary is, however, fully appreciated in *America*.

A rare and marked *exception* to the having of the Upward Range ALIKE in all the Manuals of one single Instrument will (if Hopkins's Figures be correct) be seen in the Organ of Trinity Church, New York, which had its [Tenor C Section] Swell carried right up to F^4,—one Octave above the remaining two

[CCC and CC] Manuals. This is the highest Organ Clavier Compass known to the present writer: the Treatment forms a portion of the original Scheme, and was done for the continuation of the Super-Octave Manual Coupler. In some other cases a *newer* Manual has been made of *rather* higher Range than its Unaltered fellows: a specimen of this occurs in the Hampton Court Palace Organ, originally built by Father Smith, and having its [GG] Great and Choir Manuals stopping at E^3, while its added [Tenor F] Swell rises to F^3. See also the [GG and Gamut G] Manuals of the Instrument at Exeter Cathedral.

PEDAL-BOARD.—The DOWNWARD Limit of the Pedal Key-board is, in most Organs, made to *Agree* with the Downward Boundary of the *Manuals*, or of the Chief of these, in order that the Hand and Foot Claviers may admit of being united by a Coupler, and so the Manuale be enabled to *Supplement* the Pedale Section,—thus decreasing the great cost of the latter. To this Agreement there are, however, Exceptions. The following indications of such Agreements and Exceptions, together with a few Explanations, will sufficiently Summarize, if taken in conjunction with what has just been given concerning the Manuale, the Bottom Limits of the several Pedal-board Ranges furnished in the Table of Instances.

With Manual down to Gamut B.—In the only Specimen that I could discover of a Pedal-board for this Manual-Compass, viz., that in Halberstadt Cathedral, the Bottom of such Board was certainly in agreement with the Manual Bottom of the same Instrument, but of course extended One Octave below (to *BB*),—as the reader will have already seen in the Matter preliminary to the Range Table.

With Manual down to CC.—In the great majority of cases, in all countries, where the Manuale is of this Compass, the Pedale descends to the same note, that is, to *CCC*,—as was likewise stated in the matter preliminary to the Table. Sometimes, however, one or more of the chief *Registers* of the CCC [Pedal] Section stop short of the Bottom (this occurs also with Manuals of other Range than CC); see for a few specimens under Side-Heading INSTANCES OF EXEMPLARS AND APPROX., at a little way onward. In some other Instruments, as in certain of those in France and Belgium, a total discrepancy exists, the CC Manuale being accompanied by a Pedal-board which extends only to *FFF*: this Treatment was adopted in the Organs of St. Remy's, Amiens; Antwerp Cathedral; Beauvais Cathedral; and the Abbey of St. Denis.

In the Rochester Cathedral Organ Re-modelling, mentioned under MANUALE *CC* at a little back, it is believed that the Pedals applied were to CCC.

The reader should note the Freiburg (Brisgau) Cathedral Nave Organ, in which, though the Manuale is of "Short Octave" kind, the [CCC] Pedale was made—within its limited range—"Complete." It needs hardly be added that, in any such case as this, it becomes impossible to unite the Pedal to the Manuale in a satisfactory manner.

Attention should be directed also to *Mr. Bradley's* Leominster (since Heckmondwike) Instrument,—given under Instances CC Incomplete to F^{s}, and CCC to Tenor F. Here the Pedal CC Key acted upon the Manual CC Key. For a fuller Explanation see some distance farther on, under Side-Head CCC FOR BOTH MANUAL AND PEDAL, in Division *Comparison of Compasses.*

The writer has not been able to find any Instance of a *GG* Pedal-board applied where the whole of the Manuals, or the chief of them, are of CC Range.

With Manual down to AA.—With this Manual Compass, recollect that the Pedal-board is considered to be in *Unison* with such Manuale, the name of the regular lowest Pedal Key *also* being therefore AA. In the Seville Cathedral Second Organ the Pedale appears to descend thus correspondently, —to AA. Of the only two other AA-Manuale Instruments I could discover, one—that in the Tuileries Chapel, Paris—has its Pedals going down to GG (one note below their Man.), and the other—that in St. Sulpice's in the same City—has them extending to CCC.

With Manual down to GG.—With this Manual Range likewise, and with the three here following it, remember that the Manuale and Pedal Claviers are to be regarded as in Unison one with the other. The regular deepest Pedal also, under the present Head, is therefore GG. A sufficient number of Pedal-Boards descending to this note will be found in their proper portion of the Table; and it is to be understood that the *whole* of these Boards, with the single *exception* of that of the said Tuileries Organ, are applications to GG Manuals.

In some cases with the Manual terminating on GG, the Pedal-board goes One note lower,—to FFF. An Instance—with Great and Choir—does or did occur at Chichester Cathedral: here the Pedale had but Two Stops.

To a considerable proportion of Instruments one or more of the Manuals of which descend to GG there have been applied Pedal-boards of the *CCC* Compass. Some of these are Organs that were built while the English Range of the Instrument was in the state Transitional from GG to CC-CCC; but most of them are older Works, which originally had GG for their *Pedal* as well as their Manual Basis, and so have had their [GG] Pedal-boards *Replaced* by others of CCC Bottom, in order to render them available for "Classical" Music without the cost of a regular Re-construction of their Mechanism, etc. Of course, in both these kinds the Pedal *Section* usually contains but comparatively few Registers, as the deeper Manuale serves to some extent as a substitute therefor. The following will shew the actual Treatments generally adopted with such Pedal Claviers in Britain (it has already been seen that the GG Manual is virtually confined to this country): for further Details consult the Table itself.

Of *The Pedals to CCC, with All the Manuals to GG*, an Instance of a "New" Organ is or was furnished at St. George's Hall, Liverpool; and of an Application to an Old one at St. Sepulchre's, Snow-Hill, London. Both of these Instruments have an ample independent Pedal *Section*. In the Liverpool Organ, each of the Four Manuals was made to be at pleasure acted upon in *two* ways by the Pedals, viz., in the 16 feet Pitch, and in the 8 feet Pitch. By the first of these Couplings the GG Key of the Pedal-board drew down the GG Key of the Manual,—the lowest Seven *Pedal* Keys being thus ignored: by the second of the Couplings the Uniting was done exactly as if the Manual did not descend below CC,—the deepest Five *Manual* Keys being therefore similarly ignored. In the St. Sepulchre's Organ, the *Great* Manual alone is Couple-able to the Pedals in the aforesaid two ways, the "Swell to Pedale" Uniting in the 16 ft. Pitch only, and the "Choir to Pedale" Uniting in the 8 ft. Pitch only.

Of *The Pedals to CCC, with the Great and Choir to GG, and the Remaining Manuals to CC or Shorter*, Specimens are or were afforded at Brunswick Chapel, Leeds; at the Parish Church, Leominster; and at Lincoln Cathedral. The First of these is, I believe, a "New" Instrument: it has a fair sized Pedal Section; and the Great and Choir Manuals Unite to the Pedals by only one Coupler each. The Second is an Application to an Old Organ: it also has a respectable-sized Pedale, and here again the Great and Choir have each but one Coupler to the Pedal-board. Both of these Couplers are of a Kind which may be termed *Composite;* that is to say, each Unites partly in the 16 feet, and partly in the 8 ft. Pitch, thus:—The lowest Seven Pedals draw down the Manual-Keys just as though the latter descended no deeper than CC; then the GG Pedal takes—of course sounding a Break to the Seventh below—the GG Manual-Key; and so the Connection proceeds for the remainder of the Pedal-board,—except, that as the Manuals have here no GG♯, the connection of the GG♯ Pedal has to Break upwards so as to act on the Manual Gamut G♯. (For both this Organ and the next one see the *Pedal* Sub-Division of the Table.) The Third specimen is, I believe, as when "New", and is very peculiar:—the Pedale possesses Seven Stops altogether; the Two Deep Flue Stops extend throughout the Pedal-Board; while the remaining Five, which match the representative Loud Stops of the Great, rise only to FFF♯—Seven Semitones—to *meet* each bottom [GG] Key of the Great and Choir Manuals. Consequently, One Coupling to the Pedal Clavier suffices for either of these Manuals. The Coupler which Unites the Great to the Pedal-board is of course in the 16 ft. Pitch, and totally ignores the lowest Seven Pedals.

Of *The Pedals to CCC, with only the Choir to GG, and the Great to CC*, an Instance, believed to be as when New, is furnished in the Organ at the Shire Hall, Gloucester. This has a good sized Pedal Section, and of course but one Coupler Great to Pedals; and only one Coupler Choir to Pedals—which probably Unites in the 8 ft. Pitch—is mentioned. Of an Old Instrument Altered, a Specimen appears to have been afforded by that in Durham Cathedral. Here there was but One Pedale Register; but the Couplers concerned are believed to have been as in the said Gloucester Organ.

With Manual down to FFF.—The reader has already been reminded that here again the Pedale is in Unison with the Manuale, and therefore also descends to FFF. A sufficient number of FFF Pedal-boards will be seen in their proper portion of the Range-Table: the *majority* of these are Applications to FFF Manuals.

In some few Instruments which possess more than One Manual, the Pedals and only the Great Section besides go down to FFF. A Specimen of this is or was furnished in the German Lutheran Church Organ (Savoy), London. Here the Choir descends only to GG; there is no Pedal-*Section;* no Manuale to Pedal Coupler is mentioned; and it is believed that the Great is *permanently* United to the Pedals. The Compass of the two said Manuals seems to be the original unaltered. See further in the Table.

With Manuals of FFF Compass also the Pedal-board is sometimes of CCC Range, though this is less frequently the case than with GG Manuals. The following are a few of the Instances: it is to be borne in mind that in each of them there exists one or more other Manuals (not here mentioned), which descend only either to CC or to some note not so low as CC:—

Of the Pedal-board to CCC, with the Great and Choir Sections to FFF, Specimens are or were afforded in the Exeter Hall and Temple Church Organs, both of them in London. Of the Pedals to CCC, with only the Great to FFF, an Instance is furnished in 's Hertogenbosch Cathedral Organ. Of the Pedals to CCC, with only the Choir to FFF, a Specimen is or was given in the already cited Newark Parish Church Organ (in this, the Great Section also originally descended to FFF, but was afterwards shortened to CC). Some additional details of all these Instruments will be found in the Table.

The writer has not met with any *definitely* stated Instance of an *FFF* Manual's Uniting both in the 16 ft. and the 8 ft. Pitch to the [CCC] Pedal-board: but, as the said *Newark* Organ possesses as many as Seven Couplers, Two of them *may* be of such kind. The *Lincoln Cathedral* Organ Treatment, described just back, also seems not to have been adopted with any FFF-Manuale Instrument.

With Manual down to EEE.—In the single Instance furnished, the Pedals, if existent at all, doubtless *Corresponded* with the Manual Bottom.

With Manual down to CCC.—When the Manual is carried down to CCC, its lower notes are of course intended to largely serve, by being Coupled to the Pedal-board, as a *substitute* for the CCC Pedal Organ; and the Pedals likewise are therefore then always (or all but always) made to the CCC Compass, in order that such Coupling may be naturally and regularly effected. It is equally manifest that the making of such Uniting to be in either or both the 16 ft. and 8 ft. Pitch at pleasure, by means of *two* distinct Couplers, is here easily and properly achievable; consequently, such Expedient is, commonly, employed with Manuals of this Range. Here go over the Instances of CCC Manuals given in the Table, the Pedal-boards to all of which may be accepted as being of CCC Compass,—unless the former Board of the *York Minster* (Cathedral) Chief Organ be regarded as descending to *CCCC*, which by some Builders it would. Of the same Instances the Instruments at Gloucester Cathedral and Cambridge Trinity College afford *also* Examples of the 16 ft. and 8 ft. Pedal Couplers being both applied to the one Great Manual.

The writer has naturally been *unable* to furnish any Specimen of a CCC Manual accompanied by a Pedal-board descending only to GG, or to some other note *short* of *CCC*.

....

There remains now the UPWARD Limit of the Pedal-board to be commented on. It is as well to first point out that there exists no necessity whatever fôr the Highest Note of the Pedals to be of the *same* Name as the Highest Note of the Manuale; for the latter Claviers of course always ascend much higher than does even the most extended Pedal-Board, and accordingly there never can be wanting Manual Keys to Couple to the uppermost portion of such Board, even if the latter be carried absurdly high.

The only *BB* Pedal-board contained in the Range-Table will be seen Finishing Upwards on Gamut B.

Of the sole *AA* Pedal-board in the Table, I have not been able to discover the Upward Limit.

Of the *GG* Pedal-boards of the *Non-Doubtful Ordinary* Organs in the Table, it will be seen that the Upward Compass reached as high as Gamut G in 1804 (at St. Margaret's, Westminster), that it attained to Tenor D in 1835 (at Rochester Cathedral), and arrived at Fiddle G in 1841-2 (at Canterbury Cathedral). This last Range had, however, been already achieved in 1817 in the Pedals of a *special* Instrument (the London Apollonicon). Hopkins states, on page 446 of his Treatise, that the note Gamut *A* was reached in a set of GG Pedals applied by Avery, before 1793, to the Westminster Abbey Organ: but actual proof of this is wanting.

[It needs hardly to be observed that the Pedal Keys, whatever be their Downward Compass, should never rise *above* Fiddle G, as even this is one note higher than the Vocal Bass part should ever be allowed to ascend to (see the Remarks on Advantage No. 9 of the GG Range, given under Division *Comparison of Compasses*,—forward): the Upward Extent of the *Paris Tuileries* Organ Pedals—to D^1—is therefore—if a fact—wrong. The Instance in *Christ Church, Spitalfields*, of a Pedal Range of even one note above this last, will also be seen; but this may not be the Compass of the *Clavier:* at all events it carries less weight than even the Tuileries Instrument.]

Of *FFF* Pedal-boards, the earliest of the *Certain* or *Definite* Ranges given in the Table will be found to rise to Tenor C (London German Lutheran Church Organ), the actual date being probably some year before 1781; and the next earliest of the same Compass will be seen as of date 1842 (Milan Cathedral North Side Organ). Of FFF Pedals ascending to Tenor F, the oldest Definitely stated Specimen is of year 1834 (Antwerp Cathedral Organ); while for a second Instance should be noted the date 1817-40 (Dublin St. Xavier's Organ). No *FFF* Pedal-board rising higher than Tenor F has been met with; and what has been just said will show that such an upward Range is really unnecessary.

It is as well to point out that, according to the preceding dates, the Pedal Compass rose to Tenor C some years *sooner* with the *FFF* Bottom than it did with the *GG* Bottom,—in the Certified Instances. As, however, the Builder of the FFF Instrument cited was Schnetzler, who was born in, and first worked in, Germany, the home of the separately developed Pedal Section, it is most likely that this statement of Priority is quite correct.

Concerning *CCC* Pedal-boards, seeing that they cover the longest period of time of any, somewhat more must be said:—

Of Pedals having the Range CCC to *CC*, the Definite Dates will be seen extending from 1520 or after (at Freiburg—Brisgau—Cathedral) to as late as 1840 (at St. Luke's, Manchester). The latter Organ is, strange to say, by *Hill*.

Of CCC Pedal Ranges of *over One* Octave but *under Two* Octaves, the Definite Dates will be found covering the period from 1455,—stated (at Cologne Minorets' Church) to 1882 (at St. Peter's, Shoreham). The other latest Defined dates are, 1853,—prob. abt. (at Vienna Lutheran Church); 1822 (at Cologne Jesuits' Church); 1790 (at Soleure Cathedral); and 1767 (at Cologne, Sta. Maria-de-Capitol).

Of Pedal-boards of Compass CCC to *Tenor C*, the Definite dates extend from 1630 or after (at Rouen St. Ouen's) to 1863 (Paris Notre Dame Choral). The remaining latest Defined dates are, 1849 (at London St. Paul's); 1848,—prob. abt. (at Paris, St. Vincent-de-Paul); 1845 (at Siena Conventual Church); 1845,—abt. (at Cologne Cathedral); and 1834 (at Fribourg—Switzerland—Cathedral).

[It will be here gathered that some Countries seem to be, even at the present time, hardly aware of the impropriety of carrying the Pedals no higher than Tenor C: *France*, with *Merklin* as apparently the chief offender, may be specified. Some of the *American* Organ-Builders are almost or quite as culpable.]

Of the remaining Four Compasses, the earliest Definite Date of Pedals of from CCC to *Tenor D* will be found to be 1570 or 6,—stated (at Church in Bernau); of those of from CCC to *Tenor E*, 1750 or later (Chief Org. at St. Elizabeth's, Breslau); of those of from CCC to *Tenor F*, 1830,—prob. abt. (at Church in Geneva); and of those of from CCC to *Fiddle G*, 1825,—stated (at Christ Church, Marylebone, London). It should, however, be mentioned that it is *very* doubtful indeed whether the *Bernau* Pedals were really carried so high as Tenor D: Rimbault, on page 56 of his *History of the Organ*, says "16 Keys."

These Four Pedal Ranges all continue down to and are in use at the present time (1883). With respect to the last two of them, their comparative commonness in *British* as against *Continental* Instruments should be noted;—Instances of the latter being, however, afforded at Abbeville "Cathedral," at the Church in Geneva (just cited), at St. Peter's at Rome (Proposed), at Rotterdam Octagon Church, and at Cronstadt Cathedral.

It should be added that in *America* the [CCC] Pedal Section is, even now, often not extended above *Tenor D:* in this shortcoming, *Johnson*, of Westfield, U.S., is conspicuous. In *Germany* the Tenor D Boundary has actually been officially fixed upon,—so lately as 1877: this shows conclusively the insufficient grasp acquired, after all, by this nation, over the real exigencies of the Foot Clavier: (here turn to the Ulm Cathedral Organ,—which possesses 100 Sounding-Stops, and is stated to be the largest ever built in Germany until within the last few years). In *France*, also, Tenor D is still regarded as a high Compass: (here see the Lyons Cathedral Organ).

[At this point glance at what is said concerning two great Composers, at quite the end of Division *Conclusions Reached.*]

INSTANCES OF EXEMPLARS AND THEIR APPROXIMATES.—Of an *Entire Organ* having its Compass of Sections and Registers, and its actual Contents, in Agreement with any one of the EXEMPLARY SCHEDULES furnished at the end of the present *Department*, it is believed that no Specimen as yet exists,—such Exemplars being essentially the writer's own creation. But of the distinctive *Features* of the Exemplars, or of *Approximations* thereto, some Instances do occur; and of these a few will now be cited. Many of them are contained also in the just past Table of Ranges (though not always in both of its *Sub-Divisions*), and so the additional information desirable can be there found.

Pedal Section.—Of one or more Chief *Registers* that do not descend to the Bottom of the [CCC] Pedal-board, Specimens are sometimes to be met with. In the Siena Cathedral Organ, which has a Pedal Section of 3 Registers, the 32 feet and one of the two 16 feets finish on the lowest A (AA) Pedal Key. In the Conventual Church Organ of the same City, and in the Carignano Church Organ of Genoa, the 32 ft. Register alone ceases at the same Note. In the Organ built by Booth for St. Peter's Chapel at Leeds, and in that erected by Hill during 1844-5 in the Eastbrook Chapel at Bradford, the 32 ft. Stop—Open in both cases—descends no farther than the GG Pedal Key. The 32 ft. "Contra-Bassi" of the Instrument in the Church of Santissimo Crocifisso at Como, and the only 16 ft. Open Flue Stop on the Pedale of that in Geneva Cathedral, also went no lower than the same GG. In the Organ at the London Temple Church, the 32 ft. Register, though of only the Stopped Kind, was carried no deeper than the FFF Pedal. (This last Instance underwent no alteration up to the year 1855, but the Register may have been Extended—as it has been made an *Open* one—since that time.) In the *Nave*

Organ of Freiburg Cathedral, in the Brisgau, the 16 ft. Reed of the Pedal Section likewise ceased below the deepest F Pedal Key.

Great Section.—Of one or more Great-Section *Registers* finishing on Gamut G or FF, as presented in the *Exemplars*, an Instance is or was furnished by Lincoln's (so believed) [GG] Organ in the Church of Hunton-Bridge, Watford, of which the single 8 feet Open Diapason extended no lower than the first named of these notes.

Choir Section.—Of one or more Choir Section *Registers* Shortened to the note given in the Exemplars, Specimens are not unfrequently to be found. In the Organ at St. Peter's Mancroft, Norwich, the 8 ft. Dulciana, inserted by the elder England in 1740-88, went no deeper than Gamut G: and in the [CC] Instrument erected by Schulze in the London Exhibition of 1851, and afterwards placed in the Exchange Room at Northampton, the 16 ft. Lieblich Gedact finished on the same Key. The Organ constructed by Green, in 1790, for St. George's Chapel at Windsor, had its 8 ft. Dulciana ceasing below FF. Other similar Short Stops will be discovered in such Treatises as that by *Hopkins.*

Swell Section.—Of Instances of the Swell *Section* descending, as an Entirety, only to Gamut G or to FF, a sufficiency will have been already seen in the Range Table. Of Single *Registers* going no lower than Gamut G, a quoteworthy Example is furnished in the 8 ft. Geigen Principal of Lewis's [CC] Instrument at St. Mary's R. C. Cath., Newcastle-on-Tyne. Of Specimens of one or more of the Swell Registers being *Continued, outside* their Box, to the bottom of their Manual, we may mention three:—Ashford Parish Church former [GG] Organ, by Elliott (Principal and Stopt Diapason); Hove, Brighton, Parish Church [CC] Organ, as Altered by Hedgeland (Stopt Diapason); and Ware Christ Church [CC] Organ, by Bishop (Wood Open Diapason).

Solo Section.—Of an Entire Solo *Section* finishing on Gamut G or FF, probably no Example yet exists. But of such Section's descending only to *Tenor C*, an Instance is afforded in the Newark Parish Church Organ,—for which see also in the Table of Ranges.

Couplers.—Of the Coupler *Sub-Octave to Pedale*, a very praiseworthy Specimen will be found in the Church of St. Dunstan, Fleet Street, London, of which the Organ, originally a *GG*, has had a new CCC Pedal-board applied to it, but with the existent GGG Open Pedal Pipes retained intact, and made available by means of such a Coupler. Thus the Player possesses the equivalent of a bonâ fide 32 feet Open Register running from the top of his Pedal-board to its lowest G (GG) Key. The work was executed by *Holdich* and, very possibly, so partly on his suggestion. It must, however, be remembered that here the Coupler probably neither is, nor could well have been, one of the *Part* kind; (see the Description of this given at nearly the beginning of Division *Conclusions Reached*,—at some way on).

Of the last named species of Coupler, viz., the *Part Sub-Octave to Pedale*, no Example is believed to have been yet achieved. The writer included such a Coupler in a Scheme furnished by him for the Remodelling of the Organ in St. John's Chichester; but it is not certain that the Expedient was actually applied.

Of the Coupler *Part Super-Octave to Pedale* a Specimen, acting on the 16 ft. Bourdon of the Section (CCC), does or did exist in the Organ of the Anglican Cathedral at Quebec. The Instrument itself was built by Bevington, in 1846; but the Coupler is an Insertion, applied by—I believe—Warren of Montreal, during some year prior to 1872.

Of the Couplers *Manuale to Pedals Clear* (see again in Division *Conclusions Reached*) no Example is, so far, positively statable here: enquiry may, however, be made concerning the Organ in the *Episcopal Church, Galashiels*, in the Specification of which Instrument the present writer directed such a Coupler to be included.

INSTANCES SPECIAL.

For SPECIAL INSTANCES of Organ Clavier and Register Compasses see here and there in the later portions of the present *Department*, and also, and particularly, among the Quoted Paragraphs 847-and-On under Division *Comparison of Compasses* (forward).

To these it may be added that in some few cases the very unsatisfactory Downward Compass of *Gamut A* ♯ has been employed for one or more *Registers* of a Clavier. Instances occur in the Great-Section Clarabella and Dulciana, and the Swell-Section Voix Celeste, of the Organ recently built by Henry Fincham, of London, for Lord Boston, of Hedsor, near Maidenhead.

ORIGIN AND INTRODUCTION OF COMPASSES;

CHIEFLY OF THEIR BOTTOM LIMITS.

The Information on ORIGIN and INTRODUCTION of Compasses contained in the just given Division *Instances General* may be synopsized into the following. With it are incorporated the Observations, etc., necessary.

The Compass of the Organ was at the first very *Small*, and became gradually *Extended* as the mechanical structure of the Instrument *Improved*.

The general Downward Compass of the Manuale had certainly not only Reached as low as CC, but had become Consolidated to that note, by the end of the *Sixteenth Century*, if not earlier. (See Amiens Cathedral, in the Range Table, at some way back.)

In *Germany*, the Manuale Range remained permanently set at CC, the regular development and consolidation of the separate [CCC] Pedal-Section, by the year 1570 (see the Bernau Organ, which doubtless had actual Pedal *Pipes*), or soon afterwards, having prevented the further downward course of the Hand Key-boards. Beyond Germany, the CC Manuale Compass spread, easily, to *England*, but was in this country soon extended to GG, and, occasionally, to FFF or CCC. In *France*, the CC Limit was at an early period adopted for the Manuals, with CCC for the Pedale; and these Ranges largely adhered to; but, afterwards AA was now and then employed for the Manual, and GG and FFF sometimes for the Pedal. In *Spain*, the German Compass has seemingly been even more generally followed than in France until *lately*, the innovator being again AA. In *Italy*, the Downward Range for both Manuale and Pedale has usually been either FFF or CCC, the latter the more frequently, with CC only rarely for the Manuals, but now being re-introduced for them.

Thus—as has been already virtually stated—the CC for the Manuale, and the CCC for the Pedale, may be fully received as both the oldest and the most widely diffused of all the existing Accepted Compasses of the Organ.

A slight study, and a comparison of Dates, will lead to the deduction that the aforesaid Boundaries were *found* recognized and flourishing by that mighty writer, *Sebastian Bach:* and that these Limits became fixed and stereotyped by his matchless and immortal Fugues will be accepted as readily. It should, however, be observed that he once, in a *Manual* Part, wrote down to *BB*,—for the sake of preserving a particular Figure unaltered. Of course it is not here meant that there were no large CC-CCC Organs constructed before the time of Bach: but the dates of the two *Incomplete-Octave* Instruments at Breslau, viz., 1725 and 1750, (see, under portion CC to C^3, in the Table of Ranges) certainly point to the conclusion that the "C" Bottom reached its *full* development in Germany at about the time that he—born in 1685—was in the zenith of his powers. Naturally enough, the CC-CCC Range became adhered to, in and beyond Germany, by both Organ Builders and Organ writers who were subsequent to the great Sebastian.

It is, however, impossible to believe, that either Bach, Mendelssohn, or any other of the chief German Composers for the Organ, ever made the abstract propriety or impropriety of the "C" Compass the subject of real consideration, or adopted such Downward Limit as the result of actual *conviction.* If they did so, how is it that no record has been left to us (I, at least, know of none) of the process of deduction by which such conviction was arrived at,—such a record, for instance, as we received from Galilei and Newton concerning *their* great Discoveries.

And if Bach himself had given us a thousand reasons in favour of the CC-CCC Range, they could not have brought that Range any the more *into Harmony with the Downward Compass of the Human Voice.* That such a Musician and Writer as was he should have failed to apprehend this radical want of Agreement may seem a little strange; but it is not one whit more surprising than that such a Writer as is *Hopkins* should have, in his Chapters on Compass, practically ignored the very same Point (see here at almost the end of the present *Department*).

The Chain of Incidence in and with the establishment of the "C" Bottom Range in Germany and its surrounding countries was doubtless somewhat of the following kind:—First, the *Manuale* Boundary became definitely fixed at CC: then the *Pedale* was made to CCC as a matter of course: upon this the Organ-Builder naturally came to feel that he was giving a good deal in the provision of a large independent Pedal Section of only as much as *Two Octaves* in extent: then the comparative scarcity of 32 feet Stops, even in Germany proper, and the unpleasant effect of the finger's descending on a Key which was already drawn down by a Pedal, constantly led to the Player's confining himself chiefly to the Lower portion of this Pedal-board, though at the cost of dislocations in the Progression of the Vocal Bass Part: under these circumstances Tenor C was obviously found quite high enough for the Pedals to Ascend to; and the Preservation of the Vocal Progression was allowed to remain out of sight. It must be added that one or more of such CCC Pedal-boards, though of almost modern date, were of only *One and a Half* Octaves Compass,—manifestly a climax of absurdity, because in *Exact Contradiction* to the Range of the Vocal Bass See here further forward in the Quoted Paragraphs 847-and-on, under Division *Comparison of Compasses.*

But in the *British Islands* the subject was evidently really considered; for, although both CC and CCC were *occasionally* employed as "Bottoms," the Note *generally* adopted as the lower Boundary of the Claviers was either *GG* or *FFF*,—the two sounds *most* correspondent with the Vocal Bottom. Among the Exceptional and Historical Ranges contained in the Table of Instances the following British ones should be noted:—All Hallows', Barking, London,—Manual stated as "dowble Ce-fa-ut"; the Choristers' School attached to Exeter Cathedral,—Manual believed to be to CC; Exeter Cathedral itself,—Great (including a Metal Double Diapason to the bottom) and Choir Manuals to GG; St. David's Cathedral,—Great Manual to CC; and St. Mary's, Shrewsbury,—Great and Choir Manuals to CC. All these Boundaries seem *certain* excepting *two*,—St. Mary's, and All-Hallows'. As regards the latter, it was distinctly conditioned in the Contract that the Diapason and Principals were to contain a length of 10 feet (or more) and of 5 feet respectively, and that the Compass was to comprise *Twenty-seven* Naturals. This 27 manifestly accords exactly with a Range of Four Octaves which have their lowest one "Short" by the omission of the next two Naturals above the deepest Key; and, if such Shortness were the fact, such deepest Key—a solitary one below the lowest Un-Shortened Octave—might possibly have been ignored in *naming* the Compass, though not in *defining* it or the Pipes constituting it. In such event the actual Bottom of the All-Hallows Instrument would of course have been not CC—as stated—, but "GG Short Octave"; and the Ascent would have been only to G^2.

Among the chief Continental Disagreements with the "C" Clavier Bottom, the Range-Instance Table will be found to furnish the following:—Seville Cathedral, Second Organ,—Manuale, and I believe also Pedale, to AA; the Tuileries Chapel, Paris,—Manuals to AA, and Pedale to GG; Both of the Organs in Milan Cathedral,—Manuals and Pedals to FFF; 's Hertogenbosch Cathedral,—Great Manual to FFF; and the four French and Belgian Instruments cited under the "*With Manual down to CC*" Head of the Pedal-board *Instances* given some little distance back,—all [four] of which have their Pedals to FFF (though their Manuals are to CC).

....

We are thus driven to this important Conclusion, viz., that *The Compass of the Organ never had, in the real sense of the term, any Definite Origin at all.* That is to say, the several Boundaries settled upon at different times were rarely, if ever, the result of any regular or comprehensive investigation, but usually came about in some illogical way,—often, it may be, almost by chance. Especially has this waywardness been the case in respect of the *Bottom* Limits of the Claviers,—their *Upward* Boundaries having exhibited—as we have already gathered from the Remarks following the Table of Range *Instances*—not only a smaller amount of variation *absolutely*, but also a diminution in the amount of *caprice* actuating such changes as *have* taken place. As illustrating the confusion and indefiniteness which have prevailed throughout Europe generally in the matter of the Downward Range of Musical Instruments that furnish the Bass Part, we may point out, that in Germany, the special and original *home* of the CC Organ Manual Limit, the *Stringed Double Basses* descend to AA, GG, or EEE, but *never* to CCC; while in Italy, equally the home of the entire "Viol" Family, the deepest Strings go down only to AA, although the Organ Manual has usually descended to CCC.

As affording a most forcible exemplification of the loose and unauthorized way in which the Compass of a Clavier may "grow", the reader should here note what is actually passing under his own eyes in respect of the Manual of the *Piano-forte*. This Instrument, within the memory of persons still young, Ranged, usually, only from FFF to F^4,—Six Octaves total; it now extends, in a Full Grand, from AAA to C^5,—Seven Octaves and a Third. Of this Augmentation, the Enterprising *Maker*, the Inflated *Purchaser*, the Unscrupulous *Letter*, the Ambitious *Composer*, the Aspiring *Performer*, and the Gushing *Singer* have, each and all, had some share in the production.

The Definite Adoption of the "C" Bottom in Great Britain.—We may consider that the influence of the German Compass began to be felt in England by about the end of the last Century; and that the CC-CCC Bottom became regularly accepted throughout the British Isles during a period of little more than Fifty years afterwards. This comparatively rapid Diffusion is not surprising when we reflect that any skilful Player, accustomed only to a GG Organ, would, when performing on a *fully developed* CC-CCC Instrument of the German Model, naturally experience great pleasure; for, while the independence and grandeur of the complete Pedal Section would open to him a long vista of new and beautiful effects, the presence of one or more *Thirty-two* feet Registers would prevent his realizing the difficulty that must necessarily exist in avoiding, on the *Cheaper* "C" Organ, a constant mutilation of the Vocal Bass Accompaniment (as will be treated of in the next *Division*).

At soon after the commencement of the present century, the late *Samuel Wesley* caused a CC Manual [to F^3, bel.] Organ to be built for his own use: see further for this at some way back, in the Table of Ranges. And during the year 1840 or thereabouts, the *Penny Cyclopædia* (under *Article* Organ,—Construction of) advocated CCC for the Bottom of the Great and Pedal Sections, with CC for the Boundary of the Swell.

The chief "credit" of the Admission of the CC-CCC Claviers into England is, however, generally ascribed to the late Dr. Gauntlett, acting in concert with *Mr. William Hill*,—then the Head of the [London] Organ-building Firm of that name. Doctor Gauntlett was certainly an original, clever, and energetic Musician; but he was by no means a perfectly "regulated" one; and his creation, in 1844, of the Instrument at St. Olave's, Southwark (London), with its Twenty-six Stops on its [CC] Great Manual against but Three on its [CCC] Pedale, is one which cannot under any circumstances be accepted as a *Pattern*. The Re-modelling of the Organ at Christ Church, Newgate Street (London), is also attributed to Doctor Gauntlett,—in an obituary notice which appeared in the [London] *Musical Standard* of Feb. 26, 1876; but the truth of this statement is very questionable, for, though such Re-modelling took place as early as about 1835, it yet included a [CCC] *Pedal* Section of as many as Ten Stops; and it is hardly credible that the author of such a Treatment as this would have *reverted* at some years later to such a Scheme as is that at St. Olave's. (See again back in the Range Table for both the St. Olave's and Christ Church Instruments.)

We must likewise award to the *English Organ Builders* themselves some share in the Introduction of the CC-CCC Compass to their Workshops. For, it is evident, that a CC-Manual Instrument possessing, say, but One Stop on its Pedale, can be constructed at a lower *cost* than can a GG-Manual Instrument which also has but One Pedale Stop: while yet the "C" Organ, being the "correct thing", would actually command the higher Price (,—until matters have come to find their proper level). And it is undeniable that there have been, and now are, some Organ *Players* who are so absolutely enamoured of the CC-CCC Range, that no Instrument with a Clavier of any other Bottom whatever, although such Instrument might be *perfect* in every *other* respect, would be by them for one moment tolerated.

Mr. Hopkins's Organ Treatise, which has been already once or twice mentioned, and the First Edition of which appeared in 1855, doubtless also assisted in the Adoption in Britain of the *C* Compass; and to this influence is to be joined that of Mr. H.'s personal advocacy. It may, however, be observed that he seems not to have always held this view of the subject, for it is positively stated—in a LETTER having connection with a Paper by the present writer (see at end of this *Department*, under Division *References to Further Information*, Side-head CHU. CH. MAS. AND ORG.)—that he once published a Proposal to construct Organs of small size with their Manuals descending only to *FF*.

COMPARISON OF COMPASSES; CHIEFLY OF THEIR BOTTOM LIMITS.

As *Preliminary* to the actual *Analysis* a few Remarks must be made:—

Some persons will perhaps say, that, as such writers as *Bach* and *Mendelssohn* have been seen to have definitely employed the CC-CCC Organ Compass, the question of the best *Lower* Limits for the Claviers ought to be regarded as now finally settled.

But the preceding *Division* has shown that these and other eminent Musicians must not be considered to have really examined the claims of either the *C* or any other Bottom Compass; and that the circumstances of the "Origin" of the several Lower Boundaries were such that no Note adopted can necessarily carry final authoritative weight.

And, even if the great German Composers *had* deliberately thought out the Problem, their verdict could not have been held as conclusive in the face of the decision at which other leading Musicians might then be accounted to have arrived: for, out of the *Seven* Notes (Naturals) practically admissible as Bottom Limits, *all but One*—D—have, at some time or other, been so employed,—as will be seen in the Range-Table at a little back.

It is true that—as has been also demonstrated—the *C* Compass is the one which has enjoyed the *longest* and *widest* recognition of any. But this fact possesses very little weight; for is not all real Art essentially *progressive*, and consequently *Varying*, in its nature? At this point the reader should again turn back to the Table of Ranges, and observe what is there given, under the Bottoms CC (to G^3), AA, and CCC (Ped.), in respect of the Organs in *Seville Cathedral*. He will so find two Instruments, both of them very large, standing in one same Building, and yet having the Bottom Boundaries of their Manuals, and, as is believed, of their Pedales also, differing from each other by the extent of a Minor Third. And he should further note that the Organ having the *Longer* Manuale is the *Later* of the two,—being, in fact, virtually a Modern Instrument.

Does not this case seem to indicate that at all events in *Seville* (one of the First Cities of Spain) the CC-CCC Claviers have been felt unsuitable to the requirements of the Cathedral Service.

A similar lesson appears to be inculcated by the four French and Belgian Organs, all of them having CC Manuals and FFF [to Tenor F] Pedales, furnished in the same Table. And their teaching is intensified by the facts that of course each of their Pedal-boards has thus been rendered utterly contrarient for the Coupling thereto of its Manuale; and that one of the Instruments, viz., that at St. Denis, is by a modern representative French Builder.

Now, why should not the authority of the foregoing Organs, and of others which will be seen to possess *FFF* or *GG* Bottoms, be held as, in the abstract, of weight *equal* to that claimed for the Instruments of Germany, and of the Countries influenced by her.

For these reasons, and never forgetting that *Instrumental* Music can be written to *any* Compass that is desired, we are quite justified in going into a Detailed COMPARISON of all the Range-Bottom Notes which are practically admissible, and endeavouring to select from them the one really best;—for actual and final Acceptation. It is to be understood that this Comparison applies, in any cases where the Manual-Bottoms of a single Organ are assumed to be not *alike* in Compass, to the *Chief* of such Manuale.

It is advisable to add, that in this or any other Consideration of the *Fundamental Boundary* of the Organ, the Bottom of the *Manuale* also is really involved, because of the practical necessity existent that the Lowest Note of the Pedal-board and of the Chief Manuale shall be of one same name.

BB, FOR BOTH MANUAL AND PEDAL.—This Boundary possesses the Disadvantages involved in *both* the C and the G Ranges, and should therefore be dismissed at once.

AA, FOR BOTH MANUAL AND PEDAL.—This Compass may be regarded as being on a Level with that to BB; and for the same reasons; and is thus also to be entirely discarded.

FFF, FOR BOTH MANUAL AND PEDAL.—The Merits and De-merits of this Compass will be sufficiently seen in the consideration of that which finishes on *GG*, these two Boundaries being, in great measure, the *Alternatives* of each other.

EEE, FOR BOTH MANUAL AND PEDAL.—This Note is *too* Deep for the *Manual* Clavier whenever a Pedal-Organ *also* is present, while it is yet not Deep *enough* to enable the *latter* Section to render "Classical" Music correctly.

DDD, FOR BOTH MANUAL AND PEDAL.—This Boundary is not *quite* sufficiently Low for the Pedal Part of the great Organ Fugues and other Solos, and is of course too Deep for the *Manual* Parts.

CCC, FOR BOTH MANUAL AND PEDAL.—The *Advantages* of this Compass are;—(1) that the Pedal-Section can be made much Smaller, and accordingly at less cost than with a Shorter Manual; (2) that effective four-hand Duets become practicable; (3) that the Player needs not to be a Pedalist; and (4) that the Manual can be easily and regularly Coupled to the *CCC* Pedal-board

The *Disadvantages* of the *CCC* Manual Range are;—(1) that the Inde pendence of the Pedal Section is virtually destroyed,—because of such Section's being largely Furnished by, and therefore to a corresponding extent Involved in, the Manual Sections; (2) that there is strong improbability that all the Manuals in one Instrument can finish downwards on one Same note,—because it would, obviously, be very costly to continue *every one* of them to the CCC; (3) that all Stop-Handles on the Player's Left side will be thrown more Away from him; (4) that the Touch of the Manual Bottom will be rendered Heavier (by the increased size of the Palletts), unless some Aiding Form or Mechanism be employed; and (5) that there is risk of the largest Pipes of the Manuals' not receiving enough Wind.

The said Advantages are of little weight:—The saving in the *Pedal Organ* does not amount to very much, practically, because the Pipes of its Lowest and most expensive Octave must of course *still* be supplied,—upon the Manuale (for an Instance see the late Phase of the *Westminster Abbey* Instrument). As to the playing of *Duets*, it is to be remembered that the enhanced Effect is obtained only at the cost of having two Performers instead of one. With respect to the non-necessity for being able to "*Pedal*", it is sufficient to observe that no person who cannot so use his feet is worthy of even the name of Organist. The good points with reference to the *Coupling* are equally shared in by the *CC* Manual.

The said Disadvantages are of a really serious nature. The FIRST named of them would, alone, be enough to decide the inadmissibility of the Manual Range; as a few words will show:—It would be constantly occurring that the Organist, in playing, *Piano*, upon some Manual *other* than the Great, would be compelled to Soften *also* the latter Section,—as the *only* way of obtaining a proper Pedal Bass; and this, notwithstanding the great desirableness of being able, at all times when playing on such other Manual, to have the Great Clavier *left* with a considerable proportion of its Stops *drawn*, in order that a Forte Effect may be continually and *instantaneously* available. Besides this, it might easily be that the particular Pedal Bass required could not be furnished by the CCC Manual *at all;* for it by no means follows that the Bottom of any Register necessarily constitutes the most appropriate Bass to the Remaining portions of the same Register: and this is especially not so whenever a Manual is being used for playing a Single-finger Melody upon, it being then manifestly obligatory that any *other* Part than such Melody shall be *Palpably Softer* than the latter. Again: it has been already seen—just back—that it is rarely practicable to carry *every* Manual of an Organ down to CCC; and yet, *unless* they all so descended, a fairly large Pedal Section would still be demanded; for it is one of the conditions of a really complete Organ that *every Representative Stop* upon the *whole* of its Manuals shall have its Bass Counterpart upon the Pedal Board, and it is of course impossible for, say, the [CCC] *Great*-Manual *alone* to furnish all the Downward Continuations which become, in the absence of a Regular Pedale, Substitutional for such Counterparts.

The four REMAINING Disadvantages of the CCC Manual Compass are all, likewise, of real importance:—With the want of *Agreement* in the Bottom Boundaries of the Manuals of any single Instrument there is bound up the grave consideration that wherever two or more Keyboards having such differing Boundaries are Coupled to each other, or, at one *same time*, to a set of Pedals, a Break of a very offensive character will be constantly resulting at the Lowest note of the Shorter Manual. A Specimen of this was afforded in the Westminster Abbey Organ,—as defined (to CCC, GG, and CC) just back in the Table of Ranges under Division *Instances General*. There is also involved either a radically bad Appearance, or else the cost of providing a number of virtually useless Keys. [It is right to repeat that in some cases it seems that the expense of continuing *all* the Manuals down to CCC *has* actually been incurred; see the Como Cathedral Later Organ, as likewise given in the Table of Ranges.] Concerning the throwing of the *Stop-Handles* more away from the Player, it is to be observed that such increase of distance is sufficient to cause palpable inconvenience, and that there generally exist practical obstacles to the placing of such Handles at anywhere *over* the Manuals; see further under the CC-MANUAL-AND-CCC-PEDAL Comparison Head at some little way on. With respect to the *Touch* of the Manuale Bottom, and the *Winding* of the Pipes belonging thereto, it is obvious that the extension of such Bottom must, if accompanied by *Palletts* of corresponding bigness, inevitably render *Pneumatic* or some other Aid the sooner required; and that the Cost of such assistance will have to be set against the outlay saved in the Pedal-Organ.

It is now to be mentioned that the last named four Disadvantages of the CCC [Manuale] Compass can all, with the exception of the first of them to *some* extent, be quite got rid of by the Treatment adopted—as an Experiment—by the present writer, in Rebuilding an Organ for *Mr. M. Bradley*, of Leominster (Instrument since removed to Heckmondwike). Here turn back to the same, in the CCC to Tenor F Portion of the Range Instance Table. The Treatment consisted in making the Pedal Section to comprise only Twelve Semitones, viz., a Complete Septave from BB to CCC, in Downward Continuation of the [CC] Great Section, but on a separate Soundboard, having its Sliders in permanent connection with the Sliders of the Great. The Lowest Octave of Pedal Keys acted, in the usual way, upon these Twelve Notes; and the remainder of the Pedal-board was permanently united to the Lowest Octave and a Half of the Great Manual,—the CC Pedal drawing down the CC Key, and so on upwards for the remainder.

But this Treatment, though obviating the said four Disadvantages, introduces a new defect which is in some respects *worse* than the whole of the others combined; for it is now rendered impossible to obtain a soft "Pedal-Organ" *at all* except by so Softening the Great-Organ. (The *Open Diapason* of this Manual was, however, in the Instrument here cited, made to draw in Treble and Bass separately.) Of course even such an absolute Involution of the Pedale with the Great will cause no particular inconvenience all the while that but *One* Manual is present; but as the Manuals increase in number, the faultiness of the Treatment will become more and more palpable, not only because there will then exist another Key-board which might be employed to obtain a soft Pedal Bass from *without* the aid of the Great—could the latter but be Disconnected from the Pedals—but also because every added Manual will render it still *more* desirable that the Organist shall be able to *Leave* the Great-Section Un-Softened, at the times and for the reason stated at a few paragraphs back.

It is true that there could be easily applied a *Coupler* for Connecting or Disconnecting at pleasure the Pedal-board to or from the Great and its Continuation. But this would leave the Organ, during the time of such Disconnection, entirely without a Pedal Section of *any kind whatever*, and therefore then wholly dependent for its Foot Bass upon the Bottom of the Secondary Manuale,—assuming the latter to be present: and, even with such Secondary descending to CC, and possessing a 16 feet Stop throughout, the Bass so afforded would still be a very poor onefor the Pedal-board,—unaided by any actual Pedale Register. Besides this, such Manuale, most probably the Swell, would, manifestly, be then *obliged* to descend to CC, and also to be provided with a *Coupling* to the Pedals; whereas—as will be seen at some distance on in the Divisions *Conclusions Reached* and *Exemplars*—the Treating of the SwellSection so as to enable it to Supplement the Pedal Section is a course to be by no means generally recommended.

For all these reasons we may safely lay down, that the Continuation of the Great or other Manual to CCC, in order to so obtain a partial Substitute for a regular Pedal Section, is *totally inadmissible under any circumstances whatever;* and that the second described *(Leominster)* Treatment, which is virtually a similar Elongation of the Manual, is *even more objectionable.*

....

The reader will now realize that the actual *Comparison of Compass Bottoms* lies between (I) *GG* for *both* the Manual and the Pedal, and (II) *CC* for the Manual with *CCC* for the Pedal.

GG, for both Manual and Pedal.—The *Advantages* of this Compass are as follows,—stated in the order of their Importance, and with the *most* weighty placed the *first* in each of the three Groups. (Remember that these Advantages, Negatived, constitute the *Disadvantages* of the *CC-CCC* Compass. Also that the [GG] Manuale is generally assumed to be Supplementing its Pedale.)

—Considered as to both *Manual and Pedal,* the GG Compass possesses the Good Points,—(1) that the Manuale is enabled to more effectually Supplement the Pedale; and (2) that the Lengths of the deepest Pipes—calling the several G's of 5⅓ feet, 10⅔ ft., 21⅓ ft., and (in extreme cases) 42⅔ ft. Speaking-length respectively—are especially convenient for "Fronts", and for all circumstances where, while the Pipes are really large, the Space at command is yet limited.

—Considered as to the *Manual only,* the GG Range has the Advantages,—

(3) that it agrees with the Lower Boundary of the GG Pedals,—which boundary is shortly shown to be, for them, preferable, in the *abstract*, to the CCC; (4) that it favours the Skewing of the Key-Stocks of one of a set of two or more Manuals,—for the passing of the Action between; and (5) that the [Manual] Keys below CC are sometimes useful in Orchestral Music,—as for a second Performer on a single Manual.

—Considered as to the *Pedal only*, the GG Compass possesses the Advantages,—(6) that it corresponds with the Downward Limit of the Lowest or Bass Vocal Range,—which, if reckoned as extending from Gamut G to Middle D, will of course be exactly "Octaved" by the Pedal-board of from GG to Tenor D; (7) that there will be afforded, easily and naturally, one or more Registers of virtually 32 feet Pitch, with only their deepest Seven Semitones wanting; (8) that there is secured a better Return for outlay,—because the next five or six Pipes below GG or GGG are frequently not effective *in proportion* to their size and cost, though they may be quite good in the *abstract*; (9) that the Range of the Pedal Clavier and its Section can be palpably Shortened; (10) that the Determination of the Lateral (Right and Left) Position of the Pedal-board is rendered both easier and more satisfactory,—because the confliction of the Instrumental with the Vocal Boundaries has ceased; (11) that less chance exists of the Pipes' becoming so Large as to yield no definite tone; (12) that the Touch of the lowest Pedals is usually made lighter; and (13) that the Organ bottom more nearly agrees with the bottom of the deepest *Stringed* Instruments of the Orchestra.

These Advantages of the *GG* Foundational Compass really speak for themselves; but a few *Remarks* will add to their force:—

(1) The more effective Supplementation of the Pedal Section. The Bottom of the GG Manual, whether all its Registers extend Throughout or not, will manifestly serve to Supplement the [GG] Pedale better than the CC Manual can so assist the CCC Pedale, the simple reason being the greater Depth of the former Manual. Thus, in the "GG" Organ, the Keys drawn down by the Pedals will be *one clear Octave below* the Bass as played by the left Hand, instead of, as in the "CC" Instrument, merely the *same* Keys as such Hand Bass uses. And, in particular, the GG Manual will be so able to supply the *Chorus* Stops of the Pedale; and this without much of the Fetter which must exist in its so furnishing the deeper Registers, the Freedom being caused by the fact that the Chorus of the Great-Section is generally, in Playing, accompanied by at least a portion of the Chorus of the Pedal-Section. The Addition of a Coupler *Super* Octave [GG] Manual to Pedals—the equivalent of the *ordinary* Manual to Pedals in the "C" Organ—will obviously make up to the GG Foot Section all that is obtained by such ordinary Coupler in the Instrument of the CC-CCC Compass. For these reasons, the Pedale Proper of the GG Organ will consist of but a comparatively small number of Stops, they being solely such as are required to render the Foot-Clavier *sufficiently* independent of the Manuale.

It will be seen presently, at near the middle of Division *Conclusions Reached*, that the Supplementation of the Pedale by the Manual can be palpably improved by the *Attenuation* of the Bottom of such Manual; that is to say, by the Shortening, at diverse notes, of the Ranges of some of those Registers which exist in *Duplicate* upon such Pedale. And in this view also the Longer Manual is the better; for, while with it, such Attenuations will be more natural, more economical, and more satisfactory than with the CC, they will yet, with the GG, be more *optional*, because the then diminished size of the Pedale, and its comparative Parallelism with the Manual, will lessen the amount of the Duplications themselves.

(2) The Convenient Lengths of the deepest Pipes. As regards the Fronts or other "Faces" of Organ-Cases which have "Displayed" Pipes, the *CC* Manual will often not furnish any "Notes" that look imposing enough, unless a 16 feet Open Register be present, and not always even then. But the GG Manual will be almost certain to yield what is wanted,—as with a Through Open Diapason for one side of a Front, and a Gamut G Double Open Diapason for the other. And the cost of these "G" Pipes will not be large, especially if made of *Zinc*. [*Instances* of Open Metallic Pipes, Displayed either in or as connected with the Cases of *GG Manual* Organs, are or were afforded in the following:—The Wesleyan Chapel, Canterbury,—Manual Open Diapason to Gamut G ($5\frac{1}{3}$ feet; Wood below), by H. Jones; The Anglican Cathedral, Quebec,—Manual Open Diapason throughout ($10\frac{2}{3}$ ft.), by Bevington; Exeter Cathedral,—Manual Double Diapason throughout ($21\frac{1}{3}$ ft.), by Loosemore. An Example with a *CCC* (to Tenor C) *Pedale* occurs in the Church of S.S. Peter and Paul, Görlitz, the Instrument here having its chief Displayed Pipes furnished by the Metallic portion, to FFF (FFFF note, 24 ft.) of the Pedale Gross Principal, of 32 ft. All these four Organs will be found either in the foregone Table of Ranges, or among the Instances placed thereafter.]

This Convenience of the "G" Pipe Lengths extends also to the *Interior* of the Instrument. Within the Swell-Box, especially, the Gamut G "Bottoms" are always welcome. See further forward under Advantage No. 8 of the present Compass.

(3) The agreement of the Manual with the [GG] Pedal-board. It has just been demonstrated that a Supplementation of the Pedale Section, by Uniting to it the Manual Bass, is beneficial on the score of Economy; and it will be directly seen how theoretically excellent is GG for the Pedale Bottom. The conclusion is obvious, that for the Coupling required for such Supplementation to be done in the best manner, the Downward Limit of the Manual *must* be made to agree with the Downward Limit of the Pedal-board.

(4) The Skewing of the Manual Key-Stocks. It is often desirable that the Action leading from the Tails of a set of Manual Keys shall pass *between* the Tails of a second Manual placed above or below the first one; and, for such Passing, the Skewing, on *plan*, of the entire Key-stocks of such *second* Clavier, is a simple and frequently preferable Treatment. The GG Manual Bottom

favours this Skewing, by rendering it *impossible* that *neither* the Bass nor the Treble Terminal Key shall possess a Stock thick enough to bear the requisite Thinning *and* Notching-out. Of course this advantage is lost wherever there exists a thick-stocked Key *also* at the Treble end of the Manual,—because it does not matter in *which* direction the Skew is made: therefore, in order to actually benefit by the Thick bottom Key, the Top-most note of the Manual would have to be either *B* or *E*.

(5) The Use of the Extended Manual for Orchestral Music. It is manifest that in Orchestral Compositions there may naturally often occur Passages, descending below CC, which it is desirable to play upon the Organ, and which are, nevertheless, of too *Florid* a character to be taken by the Feet,—of even the most skilful performer. The Pneumatic-Lever, now so frequently employed, will effectually preserve the *Lightness* of Touch in any Manual, however deep its Compass may be.

(6) The Correspondence of the Pedal with the Downward Vocal Limit. If any doubt be felt as to whether Gamut G-FF may be fully accepted as the *general* lower boundary of the Bass Vocal Range (at about the Medium Pitch), a glance through any representative Collection of Chants, Psalm-Tunes, or other simple Vocal Pieces will prove quite convincing in the affirmative. A perusal of *Cherubini's Counterpoint*, or of the writer's Portional *Digest* thereof (Published in *Musical Opinion:* see at end of the present *Department*), will bring to the same conclusion. The descent of the ordinary Vocal Bass Part below FF♯ must, therefore, be regarded as a really exceptional occurrence.

It is obvious that in so expensive a piece of work as is the Organ, it is highly desirable that the largest and consequently most costly Pipes shall be in fairly *constant* use by the Player; and this, too, in a natural, proper, and regular manner. But how can such employment be ever secured, unless the Fundamental or Pedal Boundary of the Instrument be made to agree with the ultimate or downward Limit of the Human Musical Organ, the average of which Limit is practically Un-Varying. Now, it has just been seen that this Vocal Boundary lies at about Gamut G-FF; and hence it follows, that the Bottom of the GERMAN Compass, *C*, is AS FAR REMOVED AS IS POSSIBLE from the Bottom of the *average Vocal Bass*, whether the latter be reckoned at the G or at the F.

And thus it comes about, that in playing any ordinary Vocal Bass upon any Pedal-board having *C* as its lower and *Fundamental* Termination, there exists, even under the best circumstances, only a choice of two evils,—viz., either to leave the deepest and finest notes untouched altogether, or to depart from the Progression of the Text, and introduce Returns or Breaks. The first of these evils is, manifestly, deplorable. The second is no better: such Breaks are real Distortions, not merely unjust to the Composer, but liable, especially if the Organ be a powerful one, to confusion with the Vocal Bass, whether in the Sanctuary or the Concert-Room. Besides this, they are embarrassing to the Player himself, for he will be constantly feeling doubt as to the precisely best *point* at which to make the *departure* from the Text. For additional matter concerning Organist's Breakings on the CCC Pedal-board, see some little distance forward, at near the end of the Answering of *Hopkins's* Paragraphs 904 to 920.

Now, all the foregoing Defects will be at once extinguished by the employment of the GG *or* FFF Pedal Clavier, and particularly will the uncertainty be then so removed as to the way of "taking" any Vocal Bass.

Of course it is quite true that the GG Pedal-board becomes equally at fault in rendering Music the Bass of which is written to the *CCC* downward Limit. But, since the Vocal Compass is, as already said, practically UNALTERABLE, while the Instrumental Compass is as virtually OPTIONAL, how very great an error must be involved, so far as the Pedal-Organ IN ITSELF is concerned, in fixing the Bottom of the latter at a point *diametrically opposite* to the Bottom of the Vocal Bass.

It is, indeed, not too much to say that this Advantage of Correspondence with the Vocal Bottom would *of itself* be quite adequate to determine the superiority of the GG or FFF Compass over all others, did not counter considerations exist in respect of the *Manual* Claviers. These will be seen treated of under the next and final Range given,—at a little onward.

(7) The easy affording of the "32" feet Register. This Advantage will be found sufficiently dwelt on in the Answering of Hopkins's Paragraph 925, at some distance forward in the present *Division*.

(8) The Pipes next below GG or GGG being not proportionately effective. In a Pedal *Sixteen* feet Open Diapason of *Wood*, the notes extending from *CC* to *GG* are, naturally, the richest of the whole; while those going from *GG* to *CCC*, though also usually good, are generally disappointing in their power, when considered *relatively* to their bulk and cost. In a 16ft. Open *Metal* Stop, the increase of price, and the relative diminution of effect at the same point, are even greater. In a Pedal Wood Open Diapason of *Thirty-two* feet, the notes extending from CCC to GGG, though admittedly bulky, are not hopelessly so; and their deep and pervading nature—under proper conditions—renders them usually well worth the space they occupy: but the remaining Seven Pipes—especially their Lowest Five—are frightfully huge and costly, and do, in fact, constitute the real objection to the introduction of this Register, except in special cases;—though, as we shall shortly see, the Open 32 feet, Curtailed, is a *generally essential* Stop in *most* Organs. As regards *Closed* Registers it will suffice to observe, that while *some* difficulty is experienced in obtaining effective tones from the Pipes extending from CCC to GGG or FFFF, it will be found *almost impossible* to produce, *below* the latter note, sounds which are otherwise than *valueless*. (Such a blemish exists in the [CC Manual] Instrument at the *Pavilion Dome, Brighton*.)

(9) The Shortening of the Pedale Compass. This Advantage of the GG Pedal Bottom comes about by its just demonstrated Correspondence with the

Downward Vocal Limit. The absolute Maximum of Ascent in the CCC Pedal-board will have been already seen to be Fiddle G; and, as this—octaved—is three notes higher than is reached by the Average Vocal Bass, it follows that there can never exist the least reason for any Pedal-board—CCC, or GG, or other—to rise *above* such G, and that therefore the omission of the Pedal Keys below GG will be a clear *subtraction* from their Total number. The Pedals from CCC to FFF♯ are, in fact, *Extras;* and it is their *addition* to the Bass Vocal Range of their Board which has begotten the bulky and costly Pedale Compass of CCC-to-Tenor-D as a Minimum. At the same time, the enforced Ascension of the CCC Board as far as such D aggravates that Confusion which has just (under Advantage 6) been spoken of; because, though such Ascension manifestly *enables* the Player to "take" all his Vocal Basses as they stand, it yet does nothing whatever to render it less *desirable* that he shall sometimes resort to the expedient of *Breaking* them.

This Curtailing of the Pedal-board Compass confers several distinct Benefits, as follows:—(*a*) If the Deepest Register of the Pedal Section be an Unison, there is a great diminution in the *size* and *cost* of the largest Pipes; while, if such Register be a Double, its Pipes become, without their bulk and expense being *very* much increased from those of a CCC Diapason, virtually of 32 feet Pitch. (*b*) There is, in the last named advantage, a corresponding economization of Room. (*c*) The Pedal-board itself, of whatever Model it be, costs less. (*d*) There is a similar saving in the Key *Action* conneeted with the Pedals. (*e*) The Pedal-board is not so likely to come in the way of the Swell Pedal. (*f*) The Touch of the Pedal Keys at both ends of their Board is more pleasant or "sweet,"—because their direction of Motion is not so unconformable to an (imaginary) line drawn from themselves to the Player. (*g*) The Pedal-board more readily enters between any Side-Projections existent in a small Organ Case. (*h*) The diminished distance apart of the top and bottom Pedals renders it *less* necessary to make their Board of the *Concave* Model,—which Model is naturally more expensive than the Flat one. (*i*) The Reduction in the *number* of the Pedal-Keys narrows both the width and the number of the Skips playable upon them, and at the same time, enables the Organist to better "localize" the whole of these Keys,—this, as obviously, contributing to the ease and accuracy of the Pedaling. (*j*) The point of Right and Left Position of the Pedal-board is rendered more optional.

(10) The satisfactory Right-and-Left Placing of the Pedal Keys Whenever these do Finish downwards on any *C*, the Positing of them correctly in the Lateral or from-Right-to-Left direction is extremely difficult. If they be viewed solely as a means of accompanying and sustaining the *Vocal* Bass, the ground of their Posit calculation should manifestly be the average Range of such Vocal Part; and, with such Range assumed as extending from Gamut G up to Middle D, the *Central* point [of these Boundaries] of course

falls between *Tenor E* and *Tenor F:* according to this, therefore, all Pedal Claviers should be Placed so that the Point *between* their *EE* and *FF* comes directly under the Player. But the *CCC* Pedal-board at any rate must be regarded also as an *Instrumental* Adjunct; and, with its Upward Compass set at Tenor D, its Centre will obviously fall on the Space between its *CC* and *DD:* and by this rule, consequently, it is the *CC*♯ *Pedal* that furnishes the Point which should come beneath the Player. Now, it is *hardly* required to observe that *both* of these Points cannot possibly be made to occupy any given Posit at one Same time; and, the only fair course left, therefore, is to Split the Difference presented by them. The Point yielded by this being on the Space *between* the *DD* and the *EE*, it finally results that the *DD*♯ Pedal is the [*theoretically*] correct one to be brought perpendicularly under the Player; —or to a *little* to his Left if the Organ be used chiefly for the Accompaniment of Voices. (For the Lateral Pedal-Position which is *actually enjoined*, see further on, under the first portion of Division *Conclusions Reached.*)

It will now be clearly perceived how the "G" Pedal-board gains its Advantage in respect of its Right and Left Placing:—Whenever the Pedal Keys Finish on GG, their Instrumental Compass is assumed and enforced to be in exact Accordance with their Vocal Limitations, and thus there can result but *one* Central Point on which to found the Practical Determination of such Placing.

Another thing will be here seen, viz., the reason why *CCC* Pedals are not "comfortable" for Playing Vocal Basses (Chants, Psalm-Tunes, Etc.) on, or for rendering Instrumental Basses which are "arranged" or grounded upon such Vocal Compass,—such reason being, that if the Organist Pedals any Bass of this kind precisely as it stands in his Copy—that is, without any Breaking—his feet will be constantly inclining towards his Right side; while if he Pedals it so as, by Breaking downwards, to bring his deepest and finest Notes into regular use, his feet will be as continually inclining towards his Left side.

It should be added that the said Left-ward Breakings have sometimes been the means of rendering the Locating of the Foot Keys still more unsatisfactory, for it is partly in order to lessen such Inclinations that Hopkins and others have advocated the Placing of the CCC Pedal-board so that its *CC* Key comes perpendicularly beneath the Middle C of the Manuale,—such a Position of course bringing the *Lowest* Pedals a little more directly under the Player. See again in the first portion of Division *Conclusions Reached*, where this Placing is shown to be really inadmissible. The GG Pedal Clavier as obviously extinguishes this source of error also.

(11) The Pipes' not becoming uselessly Large. This Advantage will be found sufficiently treated of in the Answering of Hopkins's Paragraph 892, at some little distance forward.

(12) The Lightening of the Touch of the Lowest Pedals. This Lightening, in cases where *Pneumatic Action* is not applied to the Pedal-Keys, will sometimes be quite palpable in amount.

(13) The Agreement with the Bottom of the deepest Stringed Instruments. The Downward Limits of the "Double Basses" of *Italy* and *Germany* have already been specified, under Division *Origin and Introduction;* to this it is here to be added that *France* and *England* follow *Italy* in such Limit, to a considerable extent. The Extreme Notes stated, viz., AA-EEE, of course yield the mean of GG-FFF, which, as manifestly, is exactly accordant with the GG Organ-Clavier that has FFF as its Alternative.

It may be further mentioned that, occasionally, *single* Violones (Double Basses) have been made which descended to *CCC*. The First of these was produced by Vuillaume of Paris; and it had its Long Strings Stopped by Mechanical means. It is now relegated to the Musical Conservatoire in that City. The Second was invented by the present writer and his late father, combined: it, also, had Elongated Strings, and was designed to be Stopped Mechanically; but it was deliberately abandoned *because* of not being in any agreement with the Downward Compass of the Vocal Bass. The Third and best Model is that devised by Dr. Stone, of London. It is simply a Magnified Violoncello, Ranging just one Octave below the latter, and obtaining the necessary Depth of Tone by means of an Ordinary Metallic Covering to the lower Two of its Four Strings, all such Four being, therefore, of the usual Violone Length, and Stopped by the Fingers in the ordinary way. Even this Instrument, however, has not received real support; and the secret doubtless is, that the *Italian* Violone being, in its Bottom Compass, very nearly the same as the Vocal Bass, has been found generally adequate to the rendering of the great mass of Orchestral Music,—which Music, remember, consists largely of Oratorios, Operas, and other Compositions of a Compass palpably *influenced* by the Range of the Human Musical *Voice*.

The foregoing failure of the CCC String Bottom to establish itself acquires additional significance from the fact, that in a Stringed Instrument, no extension of the Downward Compass involves any considerable *increase* in the Cost,—such as is inevitable with a similar Deepening of the Organ.

....

[The Advantages and Disadvantages of the *FFF* Organ Range will be sufficiently seen in what has now been said with reference to the GG Limit.]

CC FOR MANUAL, AND CCC FOR PEDAL.—Against the preceding formidable List of Good Points inherent to the GG Compass there can be set, as regards the CC-CCC Range, only the following *Advantages*. These are stated, as before, in the order of their Importance, and with the *most* weighty placed the *first* in each of the (two) Groups. [Bear in mind (as also before) that such Advantages, Negatived, constitute the *Disadvantages* of the *GG* Compass.]

—Considered as to the *Manual only*, the CC Range possesses the Good Points,—(1) that the Note is at the exactly correct Level to suit *all* the Manuals alike; (2) that CC corresponds generally—of course at an Octave below—with the Bottom Boundary of the Vocal Tenor Compass; (3) that the Stop-Handles on the Player's Left side are kept as near to him as is practicable; and (4) that the Shortening of the Range [to CC] permits the Scaling of any Register to be, if desired, of a more Slow or Extended *Bias;* viz., with its Pipes Graduating to a smaller or a larger diameter at a *Slower* rate,—so that those of the Treble can be of a proportionately wider Scale (diameter) than are those of the Bass.

—Considered as to the *Pedal only,* the CCC Compass possesses the Advantages,—(5) that it is the one Bottom which properly allows of the Un-Altered performance of the enormous quantity of Classical Organ-Music now in existence; (6) that the *name* of the Lowest Note is the same as that of the comparatively cheap [CC] Manual; and (7) that the whole of the largest Pipes in the Organ are naturally confined to the Pedal Section.

A few *Remarks* on these Points will be, as before, advisable:—

(1) The abstract correctness for all the Manuals alike. This will be evident upon a very little reflection. With CC as the Bottom Limit, the Pipes and Soundboards become of just the Length and Area to permit, in any Organ for which respectable funds are at command, the Manuals to be all Complete and Alike in their *Downward* Compass. No other Note would fully ensure this; DD is too high, and BB is too low. But remember that, as has been already stated in Advantage No. 2 of the GG Boundary, the "C" Lengths of the Pipes are of generally inferior convenience when really Large, or when employed for the furnishing of a Case "Front".

(2) The Correspondence of the Manual Bottom with the Vocal Tenor Bottom. All the reasons existent for the propriety of the *GG* Manual Limit, considered in its Relation to the Vocal *Bass* Part, of course hold equally good with respect to the *CC* Manual Limit, viewed in its Relation to the Vocal *Tenor* Part.

(3) The allowing of the Left side Stop-Handles to be near to the Player. (This Advantage of the CC Compass has escaped the notice of *Mr. Hopkins.*) The benefit of the Nearness is real, though slight, the actual Gain, as compared with the distance when the Manual descends to GG, being 2¾ inches. But it is to be borne in mind that in every *small* Organ the Stop will be too *few* in number for a GG Manual to cause risk of some of them being located beyond the reach of the Player; while, whenever they are numerous *enough* for it to be desirable to place the nearest of them as close to him as is possible, there will or ought to be provided sufficient means of working them, by Composition Action of some kind, *otherwise* than by Hand. The Position of the Handles might manifestly be rendered independent on the influence of any Manual Range by simply placing them *over* such Manuale: but it has already been stated—under the Consideration of the CCC Man. and Ped. Bottom—that there exist practical *Objections* to locating them thus; and to this it is to be here added, that, in any Organ which possesses as many as *Four* Manuals, such Objections are *insuperable.*

(4) The permitting of the Scale Bias to be Slower. Whenever a Clavier is

not more than *Four and a Half* Octaves in Compass, a Pipe-Scaling of even as Slow a Bias as "*G♯*"—that is, by Halving on the *Twenty-first* Semitone—can be employed for an entire Register *without* either the top Pipe's becoming too "Fat" or the bottom one too "Lean". Such a Bias will be often found very convenient for a 16 feet Gedackt or small Bourdon, extending Through, on a CC Swell Section; or for any cheap Through 16 ft. Open Flue Stop.

(5) The allowing of the Unmutilated performance of "Classical" as well as of "Vocal" Music. This capability of the CCC Pedal-board is, remember, IN THE ABSTRACT, NO ADVANTAGE AT ALL, for, as ought to be patent to any student of the subject, the Compass of every Musical Instrument should be *first* determined, according to the actual *genius* of such Instrument, and *then* the desired Music written *to* such Compass:—only, unfortunately (as we have already perceived), this order of procedure has, in the *Organ*, been virtually ignored. From the long list of both old and modern Composers who have made their Writings for the Instrument conform to the CC-CCC Bottoms the following may be quoted;—Archer, Bach, Batiste, Best, Buck, Chipp, Guilmant, Händel, Hesse, Hiles, Lefébure-Wely, Lemmens, Mendelssohn, Rinck, Smart, Dr. Spark, Thayer, and Dr. Wesley (in his later Compositions). Against this array can be set, as having adopted the GG Clavier Boundary, only a few Writers of weight, the chief of these being;—Adams, Sir G. Elvey, "Old Sam" Wesley (in his earlier Compositions), and Dr. Wesley (also in his earlier); with perhaps a Continental Composer or two, here and there.

[At this point see at a little way on, under the Answering of *Hopkins's* Paragraph 848 (*a*).]

(6) The identicity of the Name of the Bottom Pedal Note with that of the [CC] Manual. This, likewise, is, theoretically, *no Advantage*, for there is not, in the Abstract, the least necessity for the Foot Keys to finish Downwards (any more than Upwards) on the same note as do the Hand Keys. But, Practically, there is inevitably present the consideration of the *Supplementation* of the Pedal-Organ by Coupling to it the Bass of one or more of the Manual-Organs, and which Coupling cannot, of course, be correctly effected if the Bottom of the Manual do not *agree* with the Bottom of the Pedals. It is to be distinctly understood that such Supplementation is never required when the Pedal Section is of its full Theoretical size and completeness: but it is very rarely indeed that the space and funds at command will admit of this; and hence it comes about that more or less of assistance from the Manuale for the Pedals is demanded in *all but every* Organ made. We have already seen, under Division *Consideration of Uniformity*, that all Organs should be alike in the Downward Compass of their Pedal-boards; therefore, it is clearly out of question for the few Instruments that demand *no* Pedal Supplementation from the Manuale to have *their* Foot Sections made with a Bottom different from the Usual one. And thus it is—as the "cheap" Organ will, assuredly, never cease out of the land—that we have finally consented to the Pedal Bottom Limit of the *Superior* Instrument's being Permanently Deter-

mined according to the Bottom Limit found inevitable for the *Inferior* Instrument.

(7) The Largest Pipes' being Confined to the Pedal Section. The Advantages here are that such Pipes are less liable to be of inadequate Scale or Winding, or to be crowded in Planting; and that, owing to their being sounded solely by the Feet, the Organ can reach a greater size without having to be provided with Pneumatic Key-Action.

....

That which has now been said will sufficiently define what Boundaries they are which constitute the DOWNWARD IDEAL NORMAL COMPASS OF THE ORGAN CLAVIERS; viz.:—

—(*a*) For THE MANUALE; **CC**—

—(*b*) For THE PEDALE; **FFF**—

—(*c*) With *no* Coupling of the Manuale to the Pedals;—Every Manual Section thus having its Contents Determined *without* any reference to the requirements of the *Pedal* Section, while the latter is similarly Designed so as to be complete *without* receiving Aid from any *Manual*.

—(*d*) The Manuale CLAVIER Bottom *never* to Vary from the CC—

—(*e*) But the Pedale Bottom to be *GG* in the Cheapest Instruments, *FFF* in those of Medium Cost, and *EEE* in the Most Expensive ones. Thus the Compass of the Pedal-board, even when rising to Tenor F, its maximum *recommended* height, would never exceed Two Octaves and a Second. The only other lower permissible Top notes for the Pedals would be Tenor E and Tenor D,—as with the CCC Board.

(*f*) No *Variation* of the Right-and-Left *Position of the Pedal-board* with relation to the Manual (such Position having been previously Determined in accordance with the GG to Tenor D Range) would *ever* be allowed.

These IDEALS of the Manuale and Pedale Downward Range have, remember, been, more than once, actually *Realized*,—as in the Four French and Belgian Organs cited at some distance back under the Head "*With Manual down to CC*" of Division *Instances General*. Of these four, however, the *St. Denis's* Instrument, and perhaps one or more of the others, possess a *Coupling* of the Manuale to the Pedals.

....

With regard to the MANUAL SECTIONS alone, the Ideal, as stated in the FOREGOING, CAN BE CONSTANTLY CARRIED OUT in actual Practice, because the Relinquishment of the GG or FFF Pedale will have REMOVED the strongest of the reasons for Retaining the GG or FFF Manuale. The Lower Boundary of every *Complete* MANUAL SECTION WILL THEREFORE BE CC.

The PEDAL CLAVIER Bottom, however, as we have seen just previously, MUST BE FINALLY ACCEPTED AT CCC, because the great existent mass of Compositions demanding such Bottom, AND the necessity for the Manuale's generally Supplementing the Pedal Organ, furnish, when taken TOGETHER, a Reason IRRESISTIBLE.

But, although the "G" and the "F" be abandoned as Bottom notes for any CLAVIER, their claims, particularly with respect to the *Pedals*, are (as will have also been perceived) quite too great to be ignored,—in any case where Economy is a palpable object. Accordingly, in ALL Organs but those in which *Cost* is a point of little or no moment, either *G* or *F* should furnish the actual Downward Limit of (1) the *Pedale Foundation*, (2) of one or more of the *Secondary Registers* on the Complete Sections, and, usually (3) of one or more of the *Secondary Sections* themselves. All this will be found sufficiently set forth in the two *Divisions* next following the present one.

As forming the Introduction to those *Divisions*, and because the Arguments hitherto used may have appeared inconclusive, and also because much has been both Uttered and Printed which gives a totally false and blundering assessment of the GG and FFF Bottoms, we now proceed to a Critical Examination of all the Objections that can be WRONGFULLY brought against the Employment of either of these Notes as the Lowest ones of an Organ Clavier. (*Incorrect* reasons for rejecting *other* Manual Downward Boundaries below CC will be dealt with at the same time,—as may be required.) The considerations which have respect to the *Manuale* will be found partly intermixed with those which concern the *Pedale*,—complete separation of the two being impracticable because the majority of the Objections themselves involve the Hand and Foot Sections one with each other. The *Upward* Compass will be seen touched on only where desirable.

Almost all that it is possible to collect in disfavour of any *other* Clavier Bottom than the CC-CCC has been given by *Mr. Hopkins* in his Treatise THE ORGAN, already spoken of. The Erroneous Objections and Observations so made will therefore be here *first* Examined. The Order and Particularization adopted are those of his Paragraphs,—as presented in his *First* Edition. (The *Remaining* Wrongly Objective matter amounts, in point of fact, to no more than a *Pendant*.)

Paragraphs 847, 888, 900, 902 and 924:—That Church Service Music demonstrates CC to be the correct Bottom for the Manuals: That it seems self-manifesting that all Church Music clearly shows that CC is the only true Manual Bottom: That the evidence of CCC being the proper Bottom for the Pedale is derived from the "unimpeachable sources" furnished by the storehouses, English and German, of Sacred Music: and That a very great deal of the "Music written expressly for the Church cannot be correctly played" on a GG Pedal-board.

—So far as the Pedal Clavier is concerned, these assertions are simply absurd. It is obvious that *Church* Music must always be, largely, *Vocal* Music, and so will have to be conformed to the Vocal Limits, and that therefore its Bottom Part must never *overrun* the Compass of the ordinary Bass Voice. And such Vocal Compass has been already seen to extend from about *Gamut G* to *Middle D*. As respects the Manuale, it is quite true—as we have also previously stated—that *C* forms the average Bottom of the Vocal

Tenor Range: but in an immense amount of "Church" Music the *Bass* is not written in Pedal *Obbligato*, and, consequently, is quite as much a *Manual* as a *Pedal* Part. The force of this last consideration is increased by the Dictum that the Manual Bottom should, in order to allow of its Supplementing—by being Coupled to—the Pedale Bottom, be in Agreement with the latter: and it is noteworthy that Hopkins himself fully concurs with such Agreement;—see his Paragraphs 899 and 928.

But it is extremely doubtful whether, so far, at least, as relates to the *Upward* Compass of the *Pedal*-board, the "English and German Sacred Music Storehouses" can be regarded as having yielded *any didactic evidence whatever.* It is not likely that any palpable portion of this Music would have been written in actual *Nonconformity* to the Compass of the very Instruments on which it was intended to be played; while the following particulars (taken in conjunction with those already furnished) will demonstrate that such Compositions would not have much chance of being properly Rendered on the *Organ*, if their Range *did* really Correspond with that of the Vocal Basses:—

In Hopkins's Treatise alone, in the First Edition just cited, and which was Published in 1855, there are given no fewer than *Twenty* Continental Organs in which the Compass of the Pedal Clavier, descending to *CCC*, is only of from *One* to *One and a Sixth* Octaves in extent. The Countries covered are Austria, Germany, Italy, Prussia, Spain, and Switzerland; and the stated Dates of Construction embrace from 1455 to about 1853. The Instruments include such as that, of Thirty-four Sounding-Stops, erected by Meyer, during about 1620, in Frankfort-on-Main Cathedral; and that, of Forty Sounding-Stops, placed by König, during 1767, in the Church of Sta. Maria-de-Capitol, Cologne. Again, in the same book are furnished *Twenty-eight* Continental Organs the Pedal-board Compass of which extends from CCC to *Tenor C*,—*Two* Octaves. The Countries so involved are Austria, Belgium, France, Germany, Holland, Italy, Prussia, and Switzerland; and the *stated* Dates cover from 1651 to about 1845. These Instruments comprehend such as that, of Forty-eight Sounding-Stops, erected by G. and J. D. Silbermann, during 1754, in Dresden Royal Catholic Church; and that, of Forty Sounding-Stops, as left by Maas during abt. 1845, in Cologne Cathedral. Other Organs, believed to belong respectively to both of the preceding Categories, but which have not their Ranges actually specified, will also be found in Hopkins's Work.

Besides the foregoing *Continental* Specimens, "*The Organ*" contains a number of *British* ones which fall under either the first or the second of the two same Categories. These Instruments have not here been dealt with in Detail, because the Compasses possessed by them have been chiefly or wholly determined by German or other Continental *Influence.*

(*Most* of the Organs mentioned or indicated in the previous two Paragraphs will be found in the Range-Table given at some distance back under Division *Instances General.*)

Here then, after all these Claims set up on behalf of the Authority of German and English Sacred Music, we are met by this unassailable fact;—that of more than Forty-eight Notable Continental and British Sanctuary Organs, most, if not all did possess, during, at least as lately as 1855, such a Foot-Key Compass that the Bass of the simplest Vocal Piece—Chant, Psalm-Tune, Etc. —*could not possibly be correctly Pedaled* on a single one of them, if such Bass rose as high as Middle *C-Sharp* Chromatically, or as Middle *C* in any Key of Two or more Sharps: while, in a considerable portion of the same Instruments, such Pedaling would be equally unattainable if the Vocal Bass ascended above *Fiddle G;* and, in some cases even if above *Tenor C!*

The reader will not fail to see how very liable is the Bass Vocal Part to Rise above the Pedale Tops of the Organs contained in even the Higher Compassed Category of these Forty-eight. As for the ["C"] Pedal-boards of only *One Octave* Range, the difficulty is to imagine any real "Church" Composition the Bass of which could be played *at all* on any such, without an amount of Distortion so dreadful that it would be better to dispense with the Pedal Part altogether. (It is quite out of question to suppose that the *Human Vocal* Compass has Changed from what it was either at the before mentioned or any other Date. Such a supposition is unhesitatingly discountenanced by Mr. Hopkins himself: see his Parag. 735.)

Nor do the past *Fluctuations* in Musical *Pitch* (allued to at the beginning of the early Division *Consideration of Necessity, Etc.*) avail to materially soften— by having caused the Vocal Basses to be written to *Lower* Limiting Notes— the Defectiveness of the preceding Ranges. As regards the Pedal-boards which do not ascend above *Gamut A*, the influence of such Variations may of course be entirely dismissed from the case. As respects the Claviers of *Two Octaves*, the Fluctuations seemingly exhibit the shortcomings in Compass in a still *worse* light; for, while few of the Organs to which such Pedal-boards belong are either sufficiently Old to be partakers in the High Ecclesiastical Pitch which existed in Germany and elsewhere from about 1361 to 1688, or sufficiently New to share in the Rising again which may be said to have commenced about 1855, some of them were built at the time when the Pitch was quite at its *Lowest* point, and are themselves very Flat accordingly. An Instance (one of the previous) possessing such Flatness is afforded in the Strasbourg (Strassburg) Cathedral Organ, constructed by Andreas Silbermann in 1716, and which was found by Mr. Hopkins himself (in 1853) to be a *Whole Tone Below* his Fork, marked "Philharmonic", and yet to have its Pedal-Section ascending only to *Tenor C.*

This last case furnishes as striking an exemplification of an utter Failure to really grasp an important question as can well be imagined. Here is a large and fine Instrument, produced by one of the most renowned Builders that ever existed, and for one of the finest Edifices ever erected, and yet exhibiting in that part of its Clavier-system which is bound up with the Unalterable Vocal Compass, an utter *Ignoring* of the *palpable Boundaries* of that Compass. The commonest Vocal Bass, if it rose above the sound about correspondent with our present (1883) *Fiddle B-Flat*, could not possibly be played correctly on the Pedals of the Strasbourg Organ. To crown all, this blunder in respect of a matter supposed to be understood in absolute perfection throughout *Germany*, was made by a thoroughly *German* Builder, and in a virtually *German* Sanctuary: (Strasbourg was not obtained by the French before 1681).

And when we call to mind that the preceding is a really *Representative* specimen—a large number of the cited Forty-eight Instruments being either actually German or designed under German influence—, we shall feel that the immortal Sebastian had not very much chance of finding an Organ on which his *Middle F-Sharp* (see forward, at end of Division *Conclusions Reached, Etc.*) could be faithfully Pedaled.

Mr. Hopkins has certainly betrayed a considerable amount of either dim-sightedness or partiality in that he has said nothing at all concerning these radical defects in German "Examples". It is true that he does—in his Paragraph 900—give a definite endorsure to the note *Tenor D* as the *Lowest permissible* Pedal Upward Limit: but this is not enough; he was bound to have also pointed out that as the octave above such note is comprehended in the Compass of the average Vocal Bass, *no* Pedal Section whatever, which does not extend higher than Tenor C, may be for one moment regarded as an actual *Model.*

[There can be little question that the Upward Shortcomings that have now been particularized, were, indirectly, the result of the adoption of *CCC* as the Pedale Bottom Boundary; for, as the writer has already observed in the Division *Origin and Introduction*, any Range comprising as much as Two Octaves would, at first thought, naturally appear, to the average Organ-builder, to contain every Note required for the *Pedal* Clavier.]

Let the reader now view the Pedal-board of the just cited Strasbourg Cathedral Organ as in *Comparison* with the Pedal-board of the inexpensive and unassuming Compass of from *GG-to-Tenor-D.* With the former, the Player can *hardly ever* feel assured of being able to Pedal through even the simplest Vocal Piece correctly; with the latter, though of Five Semitones Less Extent, it will be fully as *rare* for his Feet to have to depart, in the least, from the Text of *any* Church Composition, unless of special charactér.

....

The foregoing analysis has mainly assumed that the Pedaling will be at all times *following* the Bass Part *exactly* as it stands for the actual Voice. But it is now to be observed, that even in Music which has its Pedal Part written in *Obbligato*, or in other *Disconnection* from the Vocal Bass, the GG or FFF Pedal-board may *still* possess a real Superiority over the CCC Clavier; for, of course, if the Pedal Bass descends below the Vocal Limit, such Pedal Part must in all probability have been first twisted away from the Original Progression, and any alteration into correspondence with such Vocal Part will therefore be only a *restoration* to such Original. An Illustration of this occurs in *Best's* Pedal Obbligato Arrangement of Händel's "And the Glory", in which, at Bar 35, the Foot Part takes a Skip of an Octave downwards, in order to be able to sound, in the next three bars, the notes *FFF* and *EEE*. This Progression of the Pedals is Objectionable for three reasons: firstly, it involves the Altering of the fundamental "motive" (Subject); secondly it tends to Confuse the Vocal Basses,—by prompting them to Drop with the Organ instead of merely Repeating the C as their Text directs; and, thirdly it increases the Difficulty to the Player, by giving to him a wide Interval to do in place of a simple "Unison". Now, the GG or FFF Pedal-board would, here, by rendering such a Dislocation of the "Subject" impracticable, have, manifestly done palpable service.

It is quite true that in the case just cited Mr. Best has simply followed the Organ or Pianoforte Part which is printed with the Vocal Score. But this only shews that the actual offender was Händel himself, or his Accompanimental Arranger,—Breaking the Progression in order to obtain, as it were, a "peck" at the finer Portion of the *CC-CCC* Organ; which Portion, as he seems to have realized, would, without such Breakings, have enjoyed but slender chance of being, in the Oratorio, heard *at all*. In the last Bar but two of the same Chorus, Mr. Best has ignored the Progression of both the Vocal *and* the Instrumental Parts as given by Händel or another, and has obtained, as the result, a long bottom *D* on the [CCC] Pedals.

It is necessary to add, on the contrary side of the Question, that, at Bars 97-8 of still the same Chorus, the presence of the Pedal Keys below GG enables the *Instrumental* Bass, in playing the *Motive* already spoken of, to *avoid* a Mutilation thereof which is, because of the more limited Range of the *Vocal* Bass, inevitable in the *latter*. This, however, shows only that which really requires no such demonstration, viz., that if the Compass of the Organ Pedals be increased beyond the Compass of the Bass Voice, it will become practicable to play, Un-Brokenly, on such *Pedals*, Progressions which cannot, without such Breaking, be sung by such *Voice*. But of course, so long as the Range of the Pedal-board is *as* great as, and *agrees* with, the Range of the Vocal Part, no Break of Progression can possibly be obligatory upon the Organist which is not equally binding upon the Singer. And the avoidance on the CCC Pedale of such mutilations as that just mentioned constitutes no real argument against the GG Pedàle; for, wherever such Alterations or Restrictions are found inevitable in the Vocal Part, it will, assuredly, be better—at any rate as a rule—to *follow*, instead of *contradicting* them, upon the Organ; otherwise, the less efficient Bass Singers will most probably be led astray.

Paragraph 848 (*a*),—end of:—That the CC Manual Bottom is the best, beyond doubt, for Concert-Room Organs (,—the GG Compass being therefore, obviously, the Inferior.)

—A totally unwarrantable assumption, on the slight evidence afforded. So far as the support and accompaniment of the *Voices* are involved—and this they must, to a large extent be, in all Concert Music—the arguments just employed hold *equally* good in the Concert Organ. And at the same time there are the *additional* considerations that, the elongation of the Manual for Florid deep Basses, and the correspondence of the Clavier Bottoms with the Bottoms of the lowest Stringed Instruments, are manifestly of *greater* importance in the Concert than in the Sanctuary Organ. See on both of these Points, at a little back, under Advantages 5 and 13 of the GG Compass.

It has already been said that the CC Bottom for the Manual now practically imposes CCC as the Bottom of the Pedal. The present therefore seems to be the place for a glance at the Question of the feasibility of performing, upon an Organ having a GG Pedal-board, Compositions which are exclusively *Instrumental* in their nature. Such Music embraces (1) the Symphonic portions of all Oratorios, Cantatas, and other Vocal Works in which aid from the Organ is assumed to be rendered, and (2) *bonâ fide* Organ Solo and Concerted Pieces, in which, through the *total* absence of any Vocal Part, the latter cannot exercise any restraint whatever upon the employment of the Deepest Six or Seven Notes of the CC-CCC Claviers.

With regard to the SYMPHONIC Matter interspersed among, or preceding, Vocal Compositions of various Forms, so far as the Compass of such matter is in *accordance* with the Vocal Range itself, of course no difficulty can be experienced in playing the same upon a GG Pedal-board. While, so far as such Symphonic portions extend *below* the Limit of the Vocal Bass, they must be viewed as being purely Instrumental; and they are, consequently, sufficiently dealt with in what next follows:—

The Question, therefore, must be really answered in connection with the regular SOLOS, CONCERTOS, ETC., which have been written especially and strictly for the CC-CCC Organ. Respecting these it must, obviously, be at once admitted that they cannot be *satisfactorily* performed upon any Pedal Clavier that descends no lower than GG or FFF. Turn now a little back to the List of "C" Writers indicated, under the Head of Advantage No. 5 of the CC-CCC Bottoms, in the present *Division*, on which it will be at once seen what a large mass of matter has accumulated that positively demands the existence of the CCC Pedal-board. Some of these Compositions pass below GG more frequently than do others; but in *all* of them the Foot Part cannot be played upon a GG or FFF Board without Alterations which are of a more or less injurious character. Still, even for Music of this kind, the defectiveness of the GG Pedals has been overrated. The most "classical" Organ Solos, even those by Sebastian Bach, *can*, with only a fair amount of skill and previous consideration in and by the Player, be achieved on GG Claviers: this, the present author can certify from actual experience,—having, so long ago as the year 1864, performed Bach's Prelude and Fugue in E Minor on an Instrument possessing but a GG Pedale of two Octaves. Nor are the Progressional Breaks Resultant in this and similar cases one whit more troublesome to *produce* without sacrificing Smoothness, or more *Unpleasant* to the ear, than are the "Returns" constantly resorted to by all Grades of Players in the rendering of strictly Vocal Music upon the average "C" Organ. On this last point note what is said at some distance on, in Answering *Hopkins's* Paragraphs 904 to 920.

There will, of course, always exist the expedient of *Transposing* an entire Composition sufficiently to bring it within the Compass of the GG or FFF Bottom. This, however, with any work bearing the almost sacred name of Bach is, clearly, not to be thought of for one moment; though the treatment might perhaps be, in some few cases, allowed with the productions of inferior writers. It must be remembered that even where the Transposition of a Piece is permissible in the *abstract*, there will always remain the objection furnished by the existence of *Individuality* in the several Keys,—though such objection needs not necessarily be regarded as having *much* weight. This matter of Key Individuality has been noticed by various authors, including Hopkins himself; see his pages 152 and on.

It will now be understood that the Argument supplied by the fact of so many Organs having had their GG Pedal-boards *Replaced* by others of CCC Compass (Instances were given, under Head *With Manual down to GG*, at a short distance following the Table of Ranges) does not tell against the GG Pedal Limit *except* as concerning any "Classical" or other purely Instrumental Music which it may have been desired to perform upon such Claviers. In the cases of many of these Replacements (as in those just Referred to) the real value of the GG *Manuale* will be seen recognized by *its* having been *Retained*,—for the purpose of supplementing the Pedale proper *without* sacrificing the Economy derived from such Manuale's Coincidence with the Vocal Bottom. And it is not too much to say, that where the actual Pedal *Organ* supplied or existent in the Instrument receiving such Replacement was relatively *Small*, the GG Range of the Manuale did render the Application of the CCC Pedals positively *more satisfactory* in some respects than if such Manuale had descended only to CC.

Paragraphs 848 (*b*), 883, and 884:—The Bottom Limit of the *Violoncello* is quoted in support of the "C" *Manuale;* but the fact of the Bottom Limit of the *Violone's* being in Disagreement with the "C" *Pedale* is not mentioned.

—This is quite unfair; for the Violone, being the Fundamental Instrument of its Species, is certainly entitled to exercise the largest amount of Influence in a question of the *Foundational* Bottom of another Musical Instrument. Here see again under Advantage No. 13 of the GG Compass, at some little distance back.

Paragraphs 850 and 879:—That the GG Manual, if devoid of a Double Stop, has, in depth of tone, the decided Disadvantage as compared with the CC Manual which possesses such a Stop throughout:—Mr. Hopkins's idea in this being to use the Double as an *Eight* feet Register.

—A really ridiculous, and not very creditable allegation. Mr. Hopkins must know quite well, that even where the Manual 16 feets in any Organ are as numerous as is legitimately allowable, yet that they will still be actually so *few*, that, when employed as 8 feets, the number of the Stops practicable to draw with them will be too small for the total to be Loud enough for any but the most *exceptional* service. Whereas the GG Manual descends at nearly or quite its *full* strength to the fifth Semitone below the CC. Besides this, there are the considerations that the Manual Doubles do not *always* extend to the CC Key, and that, indeed—as will be shortly seen in the present *Department*—it is often *not desirable* for them to do so.

Paragraphs 855 to 875:—That the Manual to GG is far more Costly than is the Manual to CC.

—The abstract truth of this statement is self-evident, and did not require for its demonstration the Five Royal 8vo. pages that Mr. Hopkins has devoted thereto. But this costliness should NEVER be mentioned excepting in conjunction with a *Second* fact which at once converts the First into an absolutely *greater cheapness* of the GG Clavier. The proper Examination of the Difference involves a slight glance at the whole question, as follows:—

I have before me two Lists, issued some few years ago, of the Prices of Organ Pipes. One List is from a London, and the other from a Birmingham House; and both are addressed, primarily, to the Organ-building "Trade". In the first List the Price of the "Metal" Open Diapason, of from F^3 to CC is quoted at from £13. 0s. to £14. 18s.; but, if extending to GG, at from £24. 0s. to £26. 10s. In the second List the same Stop, in the same Material, of from G^3 to CC is given at £11. 5s.; but if descending to GG, at £23. 0s. The rest of the 8 feets—especially the Reeds—, and all the smaller Stops, show a palpable *diminution* of the differences between the Prices for the CC and the GG Ranges.

Now the maximum of the Augmentation of Price below CC here stated is very great,—being nothing short of slightly over *Half* the *Entire* cost of the notes from G^3 to GG. Neither is such an Augmentation in any way Unfair. And though the diminished Difference in the *other* Stops would considerably lessen the Charge total, still, the Open Diapason itself would almost invariably remain, as a serious item. But the one little Fact that has been just announced, and which seems not to have been realized by Mr. Hopkins (he at all events *has not mentioned it*), and similar writers, now intervenes. It is this:—The *next Seven* Manual Semitones *below Gamut G* are inevitably of small use by *themselves*, because they follow at *directly beneath* the common Termination of the Vocal Bass; but the *next Five* Manual Semitones *below the CC* will exactly supply the notes wanting to continue such Seven Keys down to GG, and, in so doing, will transform the previously comparatively valueless [CC] Bottom of the Manuale into the really indispensable [GG] *Octave beneath* the Lowest Voice Part. The Coupler to Unite this Octave and upwards to the Pedals being—as a matter of course—provided, the Organist will at once possess what is virtually a "Vocal" *Pedal-Section of nearly or quite the same Size as the entire Great-Section of the same Instrument*,

—such "Pedale" affording a Fundamental Bass of One unaltered Octave CLEAR BELOW the Vocal Bass, *excepting* at the comparatively rare points at which such Voice descends beyond Gamut G. And such Fundamental Part will be, remember, precisely the *same* in Depth and essential Effect as if played, *without* Distortion, upon the GG-and-upwards portion of a CCC Pedal-Section of a Size and Nature identical with the entire Great-Section just indicated. A Second or *Super* Octave Coupler Manual to Pedals, which would *always* be added—for Pedal Obbligato—with the Manual extending as low as GG, has been already seen as contributing to the "G" Organ Foot Part exactly those Notes which, in a "C" Instrument, are obtained by the *Regular* Coupler Manuale to Pedale.

And thus comes about this unexpected but unassailable ultimatum;—that, for the mere *difference* of cost between the GG and the CC Manual, *added* to the trifling outlay for the *extra* Coupler to Pedals, the GG Great-Manual, unaided by a single Pedal Stop, is, as regards the actual sounds it produces, put, for all purposes of ordinary Vocal and Congregational Accompaniment, upon a level with the "C" Great-Section *combined* with a larger Pedal-Section than is usually existent in even the most expensive Organ of the latter Compass. And whenever a Secondary Manual descending to GG is also present, there is, remember, for similarly uniting to the Foot Part, the *additional* Bottom furnished by such Secondary.

Of course it is not for one moment pretended that of these two imaginary Instances the "G" will possess a real abstract *Equality* with the "C". The former is *wanting* in the Lowest Seven and therefore finest Notes; its actually deepest Pipes are probably both deficiently *Winded* and of Smallish *Scale;* and in any case the notes forming the substitute for the Pedal-Organ are inextricably and mischievously *involved* with those of the Great-Organ. But the said deepest seven notes cannot (as already seen under Advantage No. 6 of the GG Compass) be employed in any ordinary *Vocal* Music *except* by a distorting *Break* on the part of the Pedalist; the milder Winding of the lowest Pipes of the "G" Manuale often gives them a *richness and smoothness* lacking in the corresponding portion of the "C" Pedale; and the involution in the "G" of the Foundational notes with those of the Great Section (though objectionable enough to constitute an immovable bar to the actual Sanction of the Long Manual) is much *softened* by the facts that (1) the Loud Effects of the [GG] Instrument will not suffer in proportion, and (2) that any existent [GG] *Choir* Manual (to which, remember, all that has been just said concerning the Great equally applies) can be separately Coupled to the Pedals whenever a Foot Bass is required that cannot be then furnished by such Great.

And so has become manifest the terrible Costliness of the *fully developed* CC-CCC Organ as compared with the price of the GG Instrument: for, if *five* Pipes added below *fifty six* will bring the charge for the total sixty-one up to DOUBLE the price of such fifty-six, it may be certainly expected that *seven* Pipes added below such five, *together* with *eighteen* (the latter number being necessary to rise to the "full" Pedale Range) supplied above them, will render the cost of the total thirty Pipes quite QUADRUPLE that of such five. In exemplification of this it may be mentioned, that the cheaper of the two Lists just quoted from gives £23. 0*s.* as the lowest credit Price—to the Trade—for an Open Diapason of BB to CCC (twelve Pipes) in *Zinc*, and that even this is 40 per cent. under the charge for the same Pipes in "Metal". Then there are, for the "C" Organ, to be added the *entire* cost of the Stop-Action of the [Pedal] Section, and an *increase* of outlay for its Key-Action, Sound-board, and Pedal-board. The reader will see that the abstract superiority of the CC-CCC Instrument had *need* to be very great in order to make up for all this extra.

This, however, is not the whole; for, so far, the *G* Example has been assumed to possess no *Pedal-Organ* whatever. As the "16" feet and other higher Registers are already virtually present on the Pedal-board of such an Instrument, the first actual Pedale Stop to be then desired is, of course, one of *Double* or "32" ft. Pitch; and, to this there can here be never any objection, as the dreaded Pipes of from FFFF♯ to CCCC are *extinguished* by the Downward Boundarie's being GG. If such Pedale Register be a *Stopped* one, and the Compass of the Pedal Keys be only [from GG] to Tenor D, the Pipes will constitute a mere trifle in Bulk: but even an *Open* Register will here be quite practicable; and generally preferable; and this to a somewhat higher Limit than the note last named. Whichever of these two Kinds of Register is selected, the best Treatment will usually be to carry the Pipes themselves up One Octave or so *above* the Pedal-board; then to apply to them two distinct Key-Actions, one sounding them in their 32 feet, and the other in their 16 ft. Pitch; and then to Connect each such Action separately with a proper Stop-Handle, Inscribed, not as a Coupler, but as a veritable *Register*. There will thus be obtained really *two* fine Pedale Stops, employable either together or disjunctly; and this (owing to the fact of the Pedal-board's extending no higher than in the "C" Instrument, and yet being seven notes the shorter at its bottom) with only *Thirty-two* actual Pipes called for (just the number of the Pedal Keys alone when of Range from CCC to Fiddle G), unless the [GG] Pedals ascend beyond Tenor D,—and not necessarily even then, as the Extra Pipes need never be continued above Middle D.

We are now able to clearly see why it is that the "C" Organ, though *theoretically* so complete, fails *practically*, when constructed as is generally the case. We may, on the Pedal Section of the CC-CCC Instrument, add Stop after Stop, until the total positively reaches the equivalent of the *Great and Choir Sections combined* (though to actually do this is, manifestly, quite out of question), and yet, so long as we include no *Thirty-two* ft. Register, such Pedale will, in the Sounds which it produces, be, except for the *comparatively* useless notes below its GG [Key], ONLY THE EQUAL of the GG Instrument which does not contain a *single* Pedal Stop: while, in the same way, such GG Organ will, with the *addition* of a Pedale of but *one* solitary Double Register, be absolutely the SUPERIOR of such CC-CCC Organ. And the complete 32 ft. Open Stop, with the *CCC* Bottom, is so terrible an affair that it rarely finds entrance into any except quite the largest "C" Instruments. Admittedly, the CC-CCC Organ, when *fully carried out*, MUST, as it then virtually comprehends the *GG Organ with a downward Addition*, be always really the *Superior* of the actual GG; but the very great cost of the Pipes below the GGG Sound, combined with the Duplications of those above the BB [Pedal] Key, and the extra Stop-Action, etc., just mentioned, bring the Price up so alarmingly, that it finally comes about that in the average Organs Built to the CC-CCC Range the *Pedal* Section is radically inadequate, and practically ignores the 32 ft. Register altogether. In many fairly large British "C" Organs the Pedale consists of nothing more than a 16 ft. Bourdon,—of course a mere *Impertinence* regarded as an abstract Equivalent to the Bottom of an only ordinarily effective and complete GG Manual. And in nearly all cases where no 32 ft. Stop is present, there is further involved the absurdity that the *Swell* Section extends *as low* in its *Sounds* as does the Pedale,—though the provision of an efficient Foot-Foundation is constantly being put forward as a chief *reason* for discarding the GG Compass and adopting the CC-CCC. [The reader should here turn to the Organ Specifications given in the *Musical Standard*, *Musical Opinion*, and other London Journals. (The last named of these is particularized at the end of the present *Department*.)]

After all this, it is simply idle to talk about the Cheapness of the CC *Manual*. And I commend this exposition of Relative Prices, probably a new and somewhat staggering one as respects a very large portion of the "Organ" community, to the consideration of Dr. E. J. Hopkins, and other One-Sided Apostles of the "Classical" Boundaries.

It remains here only to *endorse* the wisdom of the Treatment spoken of a little back, at the conclusion of the Answering of Mr. Hopkins's Paragraph 848, *a*,—viz., the *Retaining* of the GG Manual in conjunction with the CCC Pedals in cases where funds do not admit of providing also a commensurate Pedal Section. It may be here definitely enjoined, that, *unless* such Section can be made virtually complete, with one or more 32 feet Stops descending to at least the GG Pedal Key, an existent GG Great or Choir Section, or both of these, should *always* be allowed to remain Unaltered in Applying a CCC Pedal-board. The *Uniting* of such [GG] Manuale to the Pedal Keys will be, where desirable, done by means of *two* Couplers, in the way already stated under the *With Manual down to GG* Head of the *Instances* following the Table of Ranges. (The Retention of the *Choir* Manual to GG with the *Great* Manual made to CC will be found further touched upon at some little distance forward, near the beginning of Division *Conclusions Reached*.)

Paragraph 880:—That the Manual Keys below CC are seldom used by the Hand,—as is shewn by their unworn Platings and Combs.

—This is a Fact that cuts in two directions. The *freedom* of the Manuals from Finger wear does not *cease* at above their *CC* Key, but, to a considerable degree, extends upwards to quite the *Gamut G*,—as the Keys below the latter note on, say, a CC Swell, will testify. On the modern *CCC Pedal-board,* the highest Octave or so of the Keys is, in a general way, and especially whenever there is no 32 feet Stop present, hardly ever touched by the Player. This was once amusingly proved by means of some strips of thin *Paper*, stuck —privately—on to the topmost Twelve Pedals of a New Board, and found to be unworn after even a very long period.

Paragraph 882:—That the GG Manuale Unison Stops, while extending Deeper than is required *for* such Manuale alone, cannot serve as substitutes for the *Pedale* Diapasons, because these last ought to descend to CCC.

—This point manifestly involves to a great degree the entire Question. The Objection may be regarded as being sufficiently dealt with in the *remainder* of the present Answers, notably in that to Paragraphs 847 and on, at some little distance back.

Paragraph 885:—That the Advocates of the Long and the Short Manuals respectively appear to be agreed that the 16-feet Range Bottom is the most correct one for as many of the *Stops* as is possible.

—It is difficult to conceive how so untrue a Statement as this ever came to be written. We have already seen, in the Table of Ranges given under Division *Instances General*, how *very varied*, everywhere, have been the Bottom Bounding Notes of the Organ *Sections and Claviers;* and it is to be distinctly understood that, except occasionally in GG, FFF, and CCC Pedal Sections, the Compass of the Representative STOPS does or did exist in Normal *Correspondence* with such Varied Bottoms. The Irregularities will be found indicated here and there in the same Table, especially in its Rightmost Column but one, in citing the GG and FFF Pedales. The *small* amount to which the "16-feet Range" (CCC) has been Recognized in even the last named Sections, will be seen actually *defined* at a little way forward, at the commencement of the Answering of Mr. Hopkins's Paragraphs 904-920.

Paragraph 887:—That if the Key (CC) be passed at which the Manual ought to finish, there exists nothing to prevent such Manual from being Elongated Downwards Indefinitely.

—This is a fairly ludicrous Objection. There is "nothing to prevent" the improper extension of a Clavier of *any* Compass whatever, *except* the Rules that actually govern the determination of such Compass. And there can exist no more real right to decry the GG Manual because it is liable to be over-run to, say, CCC, than to oppose the CC Manual because it may be possibly over-run to, say, GG: indeed, the *latter* is, obviously, a less unlikely thing to occur than is the former. We may here again call attention to the *York Cathedral* Organ as given in the Pedal *Sub-Division* of the Instance Range Table *ante*, and which will have been there seen to have once had its Pedal Clavier in some sense over-run from CCC to CCCC.

Paragraphs 889 and 890:—That the elongation to GG of the Manual throws the question of the Standard Lengths of the Pipes into confusion; and that this inconvenience cannot be got over.

—Here is an Objection that is no Objection. The Standard Lengths for the *G* Pipes *must* be, in the abstract, as convenient as those for the Pipes which sound *C*. What even only moderately intelligent Player could fail to at once understand "Open Diapason, 10⅔ feet (or 11 feet)," "Principal 5⅓ ft. (or 5½ feet)," and so on? is not the whole extent of the Manual, from the Bottom note of which the Standard Pipe Lengths are derived, straight before his eyes? [It is to be here observed that the *Alternative*—for simplicity—Lengths of the G Pipes which are given by Mr. Hopkins on page 103,—viz., 24 ft., 12 ft., 6 ft., etc., are quite inadmissible, being *already* in use as the *correct* Lengths for the *F* notes (by Hopkins himself among other persons, see his page 491). Such Alternatives should be 22 ft., 11 ft., etc.,—as just indicated.]

It is, of course, perfectly true that the Pipe-Lengths of the G notes of the *Unison* Stops are the *same* as the Lengths of the *Quint* notes of the C Compass Clavier. But this can constitute no real objection to the Longer Range; for, surely, no sane Organist, with the G Manual in front of him, would be in danger of drawing, say, a Principal when he wanted a Quint, merely because the Stop-Handle of the former Register bore *also* the figures "5⅓ feet."

But even if the Standard Lengths for the G notes *had* been found inconvenient, no actual argument against the GG Compass would thereby have been established; for no strict reason exists why, with the Manual descending to the latter Key, the Pipe-Lengths should not still be reckoned at *CC*. The rule of taking these Lengths at the *lowest* note of the Section is certainly a good one; even in the C Organ, however, it is obliged to be constantly violated in the cases of the Short Stops,—the Lengths of which are always reckoned and stated precisely as though such Stops extended throughout. And it will be seen under the Division *Conclusions Reached*—next onward—that it is not infrequently advisable to *Vary* the Bottom Limits of the several Manual *Sections*. Yet again, if a Clavier be *Over-run* by a Sub-Octave *Coupler* on Itself—as will also, in the *Division* just named, be shewn to be continually essential with the *Pedal* Section—,it is manifest that, so far as *that* Clavier is concerned, *either* the lowest Key *or* the lowest Note must be Relinquished for furnishing the point of Standard Length.

It will suffice here to add that Mr. Hopkins himself has "got over" the present "confusion" without the least difficulty, by simply adopting the aforesaid expedient of stating the Pipe Lengths of "G" and "F" Instruments as though they descended to *CC-CCC*.

Paragraph 892:—That if the Manual Keys be carried down to CCC, the Pedals must descend to CCCC; and that the full development of an Organ having such a Manuale would thus demand Pipes so Large as to be destitute of definite tone.

—The *First* of these Objections is an inconsistent and fallacious one. On his page 411 Mr. Hopkins says that "the deeper tones of the Manual" (to CCC) "serve as a sort of substitute for it" (a regular Pedal-Section) "in general effects." See also his page 412. These statements are perfectly true: and the CCC Pedal Organ, when correctly designed, is (as a whole) one *Octave Lower* than the CC Manuale, simply because such Pedale is the *Continuation* of such Manuale, instead of being in Normal *Unison* with the latter,—as is the case when the Manuale extends below CC.

But if it be so essential that the Pedal Section shall contain Pipes which descend an Octave beyond the deepest notes of their Manuale, how is it that out of the *seven* Model Schedules (Suggested Specifications) possessing a Manual-Double, which are furnished by Mr. Hopkins in his Treatise, only *three* have their Pedales containing any Register that extends lower than the deepest sound of such Manuale? and why is it that in one of even these cases, such Deeper Stop is obtained solely by *Acoustic* Effect, while in a second of them the relative Depth is owing *entirely* to the circumstance that the 32 feet Stop of the Manual *ceases* below Tenor C (Key)? How, in particular, is this last Scheme to be explained?—for, to be consistent with Mr. Hopkins's Objection, the presence of a 32 feet Register on the *Manual* must necessitate the inclusion of a *Sixty-four* ft. Register on the Pedale. But Mr. Hopkins neglects, throughout his entire Work, this important consideration of Relativity: he never really recognizes the 64 feet Stop; and preserves the Ultimate Relative Profundity of the Pedal Section solely by a virtual Endorsement (see his parag. 513) of the just named Concluding, on the Tenor C Key, of the Manual 32 ft. Stop.

That the Pedal Organ should contain *some* Register of Graver Pitch throughout than is the Deepest of the Manuale Stops may be regarded as a self-evident Desideratum,—if the Foot Section be to retain its especial characteristic. Such difference of Depth should never, however, be *greater* than *One Octave.* It will be seen, that in the largely "*G*" Ranged Schedules given at some distance on, under Division *Exemplars*, the keeping of the Pedale Basis at one octave below the Manuale Basis is much *more* observed than it is in Mr. Hopkins's essentially "*C*" Schemes.

As respects the *Second* of the Objections, viz., that the Longer Manuals may lead to a demand for Pipes that are impractically and uselessly *bulky*, a rather fuller notice is advisable:—

The actual point at which the Vibrations of a Single Organ-Pipe become slow enough to render its sounds practically useless has never, so far as I am aware, been positively determined; but such point is generally set at *about BBBB.* Some years ago, however, the late Mr. William Hill, the eminent Organ-Builder, projected, for the Sydenham Crystal Palace, an Instrument having a *Sixty-four* feet "Front" of Metallic Speaking Pipes, descending, Open, to *CCCCC*, and forming a portion of the Pedal Section. In answer to a question from the present writer, Mr. Hill stated that he believed that the Register would have been of service—sounding with its accompanying *Har-*

monies—even to its lowest note. If Pipes extending to CCCCC be really worth construction, it is obvious that a Series finishing on, for instance, *GGGG* must be quite admissible.

We may, on the whole, say that there exist *three* reasons that completely refute the Assertion that the Long Manuals render the Lowest Pipes liable to be unduly large and deep:—

The first reason—previously called forth by the First Objection—lies in the already stated fact that the GG and other Long Manuals are always assumed to be Normally in *Unison* with their Pedal Sections; from which it follows that any Note which is Two Octaves below the Bottom of the *Manual* will then be Two Octaves below the Bottom of the *Pedal-board also.* Therefore, as such Distance Below is found really Deep enough for even the Largest Organs, it is manifest that if the Pedals finish on, for instance, GG, the Lowest Pipe ever required will not, even when of the Open kind, exceed the *Forty-two and Two-thirds* feet Speaking-Length. And thus the "G" Instrument here possesses, *theoretically*, an actual *Advantage* over the "C"; for, as the *CC* Manual must be accompanied by a Pedale descending as far as CCC, a distance of Two Octaves Below the deepest Pedal Key will then obviously mean nothing short of a descent to the C of *Sixty-four* feet.

The second reason is furnished by the Finishing of the Manual 32 ft. Register on the *Tenor C* Key,—also previously mentioned in Answering the First Objection. Such a Limitation is certainly Advisable,—assuming so Deep a Stop to be admissible *at all* upon the Manuale (the present writer would discountenance both it and the Pedale 64 feet): and it is equally manifest that this Limitation carries with it, or at least permits, the Finishing, on the *CC* [Pedal] Key, of any Pedale Register of 64 feet (this is *why* the *Advantage* stated in the preceding paragraph is only theoretical). And it thus becomes obvious that Mr. Hopkins, by Agreeing with such Shortening of the Manual 32 ft. Stop, virtually demolishes his own assertion that the Long Manuale tends to introduce Pipes of unduly Large size; for the Propriety of the Tenor C Key as the Bottom of the Manual 32 ft. Register—and, consequently, of the CC Key as the Bottom of the 64 ft. Pedale Register—is *not* Dependent upon the Manual's Finishing on *CC*, but is equally existent when it descends *beyond* the latter note.

The third reason is that Sounds deeper than CCCC can, if desired, be produced without either employing Pipes which are of "nearly the height and bulk of factory chimnies," or creating fear that such Sounds will be destitute of proper Definiteness. A few paragraphs back, reference was made to a Speaking Stop obtained by means of *Acoustic Effect.* This Effect is by a Device consisting in causing to sound together two suitable Pipes the Higher of which is exactly a *Major Fifth above* the Lower, the Acoustic Result being a note *One Octave below* the deeper of the two single sounds. Such Resultant note is, of course, less in *volume* than if produced by a Pipe of the regular or Normal Length. In the case of the Acoustic *Thirty-two* feet Stop, all really required extra is a "Great Quint" of $10\frac{2}{3}$ ft. size of tone, Speaking in conjunction with an ordinary 16 ft. Open Diapason (assumed to be already present): and there will thus be so demanded no Pipe larger than the CCC of *about* 16 feet actual length.

It will be at once manifest that the same Treatment can be resorted to for obtaining still Deeper sounds, and that thus, by the addition of a *Quint* of $21\frac{1}{3}$ feet size of tone to an Open Diapason of 32 ft. length, a *Sixty-four* ft. Acoustic Register complete to CCCCC can be secured,—without employing any Pipe larger than is included in all fully developed CCC Pedal-Sections. And this, in fact, has been already actually done,—as by *Schulze*, in his Bremen Cathedral Organ, described by Hopkins on pages 365-6. Schulze's idea was, doubtless, the same as that which has been just spoken of, viz., the keeping of the Pedale at one Octave beneath the Manuale,—there being in the Bremen Instrument a 32 ft. Stop on the Great Section, (and, indeed on the Choir Section also,—neither Register, however, descending below the Tenor C [Key]).

[This Expedient of an *Acoustic Bass* is said to have been discovered—during about the year 1800—by the *Abbé Vogler*, of Würzburg, Bavaria.]

Paragraph 893:—That one peculiarity of "Long" (GG or deeper) "Manual" Organs is the "unsuccessful" Device of mimicking the effect of a 16 feet Stop by Coupling the *Choir* Section, in its Sub-Octave, to the Great Section. Mr. Hopkins qualifies this statement by virtually admitting that such a Coupler may be employed in *old* Organs as partially Re-modelled.

—There is not, necessarily, any connection whatever between the Coupler *Choir Sub-Octave to Great* and the GG or other "Long" Manual, though of course such Coupler is rendered more *complete* by any Downward Extension of the Manual from which it so draws. The case really stands thus:—It may sometimes occur that an Organ which has Three Manuals cannot or does not possess more than One Register of 16 feet among them all. Now, theoretically, such a "Double" should be placed upon the *Chief*, that is, upon the *Great* Section; but, in practice, a Softish 16 ft. Stop is found to be so valuable for the "Thickening" of a Single-hand Accompaniment on the Upper portion of a Manual, that a sole Double is frequently allotted—quite properly—to the *Swell* Section instead. Such Double can, obviously, be virtually brought, by means of the Coupler Swell [Unison] to Great, upon the actual latter Manual; but the 16 feet sound, as so obtained, will rarely be powerful enough for general Effects. A Coupler *Swell* Sub-Octave to Great would, manifestly, supply the desideratum; but this might involve the Double's Sounds' being *too* powerful, or the Great Manual Touche's being rendered too heavy, or the number of Distinct Effects attainable's being lessened. Or, the Swell Section might not descend so *low* as CC. Now, *all these Considerations will be at once met by the Application of the Coupler* CHOIR *Sub-Octave to Great.*

These points have not, apparently, been perceived by Mr. Hopkins: at any rate they have not been mentioned by him. And one consequence of this is, that he decidedly enjoins the allotting of the Double Stop *always* to the Great Section in preference to the Swell Section (see his paragraph 1232, and the Model Schedule next preceding it).

Exactly such a case as that imagined in the last Paragraph but one occurs or did occur in the *Halifax* Parish Church Organ, which had its Great and Choir Sections descending to GG, and its Swell to Gamut G, and was afterwards provided—by *Hill*—with the Coupler Choir Sub-Octave to Great. The Specification is given by Hopkins on page 519, and is accompanied by the remark that the Coupler "proved unusually effective", *because* of the *greater* Depth of the Choir Manual Sounds.

An Instance of the Coupler as Applied to a "*New*" Work, having all its Manuals Finishing on CC, and one or more Double Stops on both the Great and the Swell, is afforded in the Organ built by Gray and Davison, in 1853, for the Glasgow City Hall. This Instrument is described by Hopkins on pages 554-5, and is there termed a "large and fine" one.

Paragraph 903:—That the Stops on a GG Manual undergo an Alteration of Pitch according to whether they are sounded by the *hands* or by the *feet*,—this being exemplified by the [Manual] *Open Diapason*, which is stated to be of 8 feet pitch in the former, and 16 ft. pitch in the latter, case.

—It is very difficult to have patience with Objections of this nature. The GG Manual Keys, like those of the CC Manual, of course really sound in precisely one *same* Pitch whether they be pressed down by the Fingers or drawn down by the Feet, only, that in the Longer Manual, the Keys which the Pedal-board so operates are *below* and clear of those generally played by the left Hand, instead of being, as in the Shorter Manual, *merely* such Hand-used Keys. And a most excellent feature in the "G" Organ this is,—as will have been fully seen at some distance back, in the *Remarks* on Advantage No. 1 of the GG Manual and Pedal Compass. The truth is, that Mr. Hopkins has here written his Illustrative Notes at one Octave too *High*, and has then apparently deduced from them a totally false Conclusion.

Paragraphs 904 to 920:—That it is impossible to satisfactorily attach to a GG Pedal-board a Series of Pipes which have *CCC* as their Deepest sound, the resultant Breaks and Returns at the lowest C Pedal Key being "often.... of the most startling and painful description".

—This Objection is a pure Manufacture,—the outcome of either ignorance or a species of unfairness. Whether CCC be or be not, in the *abstract*, the correct Bottom for the Playing Pedals, it certainly cannot be the correct Bottom for them when they Finish on *GG*,—such a Board having no more real obligation to be saddled with CCC-Boundary Pipes than has a CCC Board to be yoked to a GGG-Boundary Series. That "C" Pipes *have* been thus applied to GG Pedals will have been already seen in the second Column from-the-right of the Pedal Portion of the Table of Ranges given under *Instances*

General, where the GG and FFF Boards that do so Break are severally specified,—among them appearing, as for a short time, Mr. Hopkins's own Instrument at the Temple Church. It should be added that the actual *Proportion* of the GG and FFF Pedal Sections so Disfigured amounted, by about the year 1855, to *rather less than One in every Three* Organs. But such an inversion of Bottom Note can have been owing only to either the lack of funds or of room for the Pipes below CCC, or to the ignorance of the Applicator; the correct Treatment will be seen upon a second examination of the aforesaid Column, in the Examples afforded by no fewer than *Twelve* Un-Broken GG and FFF Pedales of Double Pitch alone,—besides Un-Broken *Unison* Specimens (in which latter a Return would, manifestly, be absurd), and others which have not been definitely ascertained. Almost all these Un-Broken Instances were well known to Mr. Hopkins,—being given in his Book: and to them must be added many like Examples with which he was unacquainted. Of course, if we *assume* that *C* is the only proper Foundational Boundary for the Instrument, the C-Bottom Pipes become at once inevitable; but this is just the point that involves the *entire question*, and has, therefore, no business whatever to be taken for granted.

But this is not all. It has already been shewn, in the present *Division*, under Advantage No. 8 of the GG Compass, that the Pipes immediately below certain *G's*, or thereabouts, are often not Effective in *proportion* to their Cost. Hence it follows, that there is really, in the abstract, *more* chance of a Break's existing on a *CCC* Pedal-Section, at its lowest *A*, *G*, or *F* Key, than of a similar Return on a *GG* Pedale, at its lowest *C* Key,—such Breaks on the CCC being caused either by the Pipes *ascending*, below the *GG* or other Pedal, to the Octave Higher; or by there being no Pedal Pipes *whatever* below the said GG or other Pedal,—the Return being made by the Pedal Key-Action itself's Repeating; or by the bottom Pipes of a *portion* of the Pedal Section's being absent,—without any Return of the Key-Action. The Table of Ranges in Division *Instances General* will afford Information here also; turn back once again to its second-from-the Right Column, at the CCC [to Tenor D] Pedal Portion of which will be found, in the *Leominster* Organ, a marked specimen of a Return produced solely by the Key-Action,—the Pedal Section—consisting of two Wood Open Diapasons of $21\frac{1}{3}$ ft. and $10\frac{2}{3}$ ft. respectively—here entirely ceasing at the GG of the Pedal-board, and the Lowest Seven Pedals merely acting for the Second time upon the CC-FF♯ Pipes. Of Breaks on CCC Pedal Sections, caused by the Dying out one of or more *Individual* Stops at the lowest A, G, or F Pedal Key, Specimens will be seen among the *last* of the Instruments cited in the same Division *Instances General*.

In the Leominster Organ, the Breaks and Returns, when they do occur, produce Effects which are fully as "startling and painful" as any that could possibly exist on a *GG* Instrument. And they would be still more offensive were it not that the *Correspondence* of the Downward Vocal Limit with the

[Virtual] Downward Pedal-Section Limit once more steps in to render valuable Aid,—by generally excluding the Distortions from all but "Classical" Music. The same Correspondence obviously extends a similarly Saving influence to the [CCC] Pedal Sections which possess "Dying Out" GG or FFF Registers.

Of course, *any* of these Returns or Breaks, on *whatever* Note made, is, when sufficiently strong to strike the Ear, *totally inadmissible* to any properly constructed Organ: and Mr. Hopkins needed not to employ Two and a Half of his pages, together with the help of Music Type, for demonstrating so simple a matter. But *any* Break on a Pedal-Section alone must inevitably be more or less *Veilable* by the Manuale-to-Pedale *Couplers:* and, in the *GG* Instrument, such Veiling is of the most palpable character, firstly because such Couplers are in *constant* Use for supplying the Substitute for the Pedal Section; and secondly because, owing to such supplying, the actual Pedale Registers, or at all events those of them in which the Break occurs, are virtually limited to *One deep Diapason.*

But if such greatly Ameliorated Return, on a Single Deep Register, be yet actually Inadmissible, what must be thought of the recommendation given by Mr. Hopkins himself—on page 571—, that CCC Pedal Sections which include no 32 feet Stop should Borrow the same by means of a Coupler Uniting to the Pedal-board the "Sub-" Octave of some Manual which possesses a 16 ft. Stop throughout. It has been already observed that Mr. H. would in every case have the Manual 16 ft. Register placed *first* upon the Great Section: consequently, in a large number of Organs, as *he* would design them, such Section would be the *only* one that could furnish such Borrowed 32 feet. Now, just imagine the horrible effect of the Cessation-Break, at between the CC and BB of the Pedals, that would result whenever such a Coupler was used in conjunction with the Full Organ concentrated upon the Great Manual.

Still, bad as all this is, worse remains behind. So far, the Breaks or Returns, even if proved glaring, have been made in and by the *Instrument* itself: the *Player* has been Innocent. But the reader should now more thoroughly understand that there are often, in the CC-CCC Organ, other Breakings actually Inevitable, which are not only more offensive in themselves than the preceding on the GG Instrument, but worse yet again because of being made by the *Player.* It has previously been seen, in Answering the first of Mr. Hopkins's Objections, at Paragraphs 847-924, how grievously have German Builders, supposed to be the great authorities on Organ Compass, fallen short in the Upward Reach of the Pedales of many of their chief Instruments: now, realize what must be the effect of any Pedal Bass which ascends above the Top of its Clavier, and so has to be absolutely Broken downwards by the *Pedalist.* Recollect that such Ruptures are not limited to even to the Full Pedal Section, but will extend also to every Manual Register which is capable of being Placed on the Pedals,—in other words, usually to *every Sounding-Stop in the Organ.*

We have, however, even yet not reached the lowest Depth of the Subject. In all such cases as the last stated, a slight and proper Upward *Continuation* of the Pedal Compass will at once *annihilate* the error. But even after such Continuation is furnished, the "C" Organist will still be constantly found ignoring it, and employing only the Lower Portion of his Pedal-board; for on the CCC Pedals the notes below the Vocal Bass Range are (as has already been more than once shown) absolutely useless all the while any such Vocal Part is strictly adhered to by the Feet. It is extremely doubtful whether this most important and fundamental Truth has ever been actually realized. Just reflect; the Church, Chapel, or other Sanctuary Organist might seat himself at a CC-CCC Instrument as a boy, and get up from it as an old man, and yet, if he always Pedaled the Basses of his Chants, Psalm-tunes, etc., faithfully according to the Vocal Text, *he could not, during all those long years, have* EVER *once sounded his deepest and by far most costly four or five Notes*,—excepting in his Voluntaries.

Such deepest Pedal Sounds, therefore, can come into use only (1) by means of the purely Instrumental Pieces in which the *C* Bottom is definitely adopted, and the Vocal Bottom wholly ignored, or (2) by the Specially-written Versions of Music originally Composed for Voices, or (3) by the just named Breaking by the Player of the Progression of the Vocal Bass, so as to Return below the latter. The first two of these cases need not involve any Progressional Inaccuracy. The third, utterly vicious and confusing as we have now seen it to be, is yet what every "C" Organist, however accomplished, has to constantly resort to in accompanying Voices, unless he possesses one or more 32 feet Stops on his Pedale: and the obligation is rendered still more annoying by the frequent difficulty of making the Break in a way unoffensive to the ear. As to the actual 32 feet Registers, it is unnecessary to repeat how rarely even a single one of them is contained in any except the really Large Organ: besides which, even *should* such Stop or Stops be present, it or they will, if extending complete to the Bottom, do no more than *moderate* the Player's temptation to Break downwards; for the *Extra-vocal*, *i.e.*, the *Lowest*, portion of the [CCC] Pedal-board will *still* yield the *finest* notes of its Section. As to the abstract inevitableness of such Breaks, it will suffice to point out that *almost* the *whole* of the work of every *Sanctuary* Organist is involved with the Vocal Compass.

Now, will it be believed, that of these most offensive Breakings by the Player, *not a single mention has* here *been made by Mr. Hopkins.*

But, evil as is this habit of the Organist's Breaking, it is hopeless to expect its Abandonment all the while that the "C" Instrument is constructed as it is at present, viz., with *very seldom* any Register contained that sounds below CCC, and with *very rarely indeed* more than *one* Stop of 32 feet pitch. For when the Player finds that he must either distort his Text, or else fail to employ any note deeper than about *FFF*, he is not often long in making his choice, and thenceforward confining his accompanimental Pedaling as much as possible to the Lowest Octave and a Half or so of the Board. And it is quite idle to assert that, because such Breaks are not produced actually by the *Instrument*, but by the *Player*, they do not furnish any real argument against the use of the CC-CCC Range. So far as concerns Breakings on any Pedal-board which does not extend above *Tenor C*, of course a *direct* faultiness on the part of the Organ is clearly made out: while as regards all cases in which the Upward Compass of the [CCC] Pedal Keys *is* commensurate, the Instrument must still be held *virtually* answerable, *unless* the "Vocal" Portion of its Pedal Section is given such a Relative Depth and Sufficiency as Designers of "C" Organs have hardly dreamed of up to the present time.

After all this, Mr. Hopkins's observation in paragraph 924, that "it is as necessary to have the Bass Part of a Composition played in an intelligible and correct manner as is any other" sounds almost like a joke; and his assertion, in the same paragraph, that, "in an Instrument so defective" (viz., the GG Organ as just exhibited by himself) . . . . "the greater part of the Music of the Church either cannot be played at all, or only without due effect," becomes simply a flagrant (though of course unintentional) misrepresentation of fact.

(The evil resultant in respect of the Player's Downward Breakings' tending to cause the Pedal-board's being *Placed* too far to the Right has been already treated of under Advantage No. 10 of the GG [Pedal] Range,—in the present *Division.*)

As a Wind-up of the present Answering, I have not the least hesitation in stigmatizing Mr. Hopkins's Implication that Breaks in the Pedal Pipes do accrue as a regular Feature in the GG Organ, as an *absolute fallacy*,—utterly unworthy of a Musician and Writer of his general Solidity and Excellence.

Paragraph 921:—That the GG Compass, by bringing about the *Returned* Pipes on the Pedale, involves the introduction of the Double—the "32" feet—Register before any "16" ft. Stop is provided on that Section.

—The Returned Pedal Pipes having been already (at a little back) shown to possess no necessary *Connection* whatever with the employment of the GG Range, this Objection has, manifestly, therewith fallen to the ground. But even were it otherwise, such objection could have very little force, because, whenever the Claviers descend to GG, the Pedal "16" feet Registers will inevitably be, to a large extent, virtually present on the *Manuale*. Again; it has also been demonstrated—under Answer to Paragraphs 855 to 875—that, on the Pedale of the GG Organ, the introduction of the "16" ft. Register is *especially* easy and inexpensive.

Paragraph 924:—That the term "Pedal Pipes," sometimes found on a Stop-Handle of the GG Organ, is "devoid of definiteness and intelligibility."

—One more frivolous objection. It has been already indicated, that as a Manual which descends as Low as GG will virtually furnish *also* the chief portion of the *Pedal* Section, the latter might often consist of but a *single* Stop: and for such, therefore, the name "Pedal Pipes" is, though of course not actually definitive, practically as good as any other.

Paragraph 925:—That the GG Compass is the means of bringing "Double" (*i.e.*, "32" feet) Pedal Pipes into Organs which are of too Small size to properly bear the presence of such a Register.

—That the GG Pedale Range affords an easy and natural way of providing the small Organ with a Stop of 32 ft. Pitch, *minus its bulkiest and least useful Pipes*, is quite Incontrovertible. But this, so far from furnishing any real argument *against* the employment of such Range, constitutes one of the very strongest points in its *favour*,—as we have already intimated among the *Advantages* appertaining to the GG Bottom collectively. Such Facility, in fact, strikes at the very root of the great Deficiency of the CC-CCC Organ, viz., its lack of *Depth*, even when aided by Downward Breakings, unless an actual 32 feet Register be present. *Undoubtedly*, all but the very *smallest* Organs should possess a Pedal Section, even if of only One Stop; and every such Section should, as certainly (see previously, under Answer to Paragraph 892) contain some Sounds of Lower Pitch than the Lowest Sounds of any Manual of the same Instrument. Now, in the GG Organ, the Pitch of a Stop which is one Octave deeper than only the Manual *Diapasons* cannot, of course, be anything short of the 21⅓ feet Length,—either Actual or Tone size: in other words, such Stop will be the equivalent of the 32 ft. Register of the CCC Pedale with its deepest Seven Pipes omitted. And therefore—as a Pedal Section consisting of but a single Register in *Unison* with the Manuale is really Inadmissible to any Organ—, the GG Instrument is, Normally, always guaranteed a proper Foundation: while, with the CC-CCC Organ, the 32 ft. Stop, though just as indispensable as with the GG Claviers, is—*excepting as is given in the* EXEMPLARS *of the present Department*—to a great extent practically unattainable.

And, even if the preceding could be disproved, Mr. Hopkins's present Objection to the GG Compass would possess no real Weight, because his whole teaching on the subject of the 32 feet Register is so self-contradictory. Thus, at Paragraph 927, he strictly forbids the introduction of such a Register to any but the *quite large* Instrument: and in his Model Schedules this restriction is faithfully preserved,—the Number of Sounding-Stops in the Organ being allowed to reach *Fifty* before any actual 32 ft. is admitted; and even then it is only one of the Closed kind. But other parts of the same Treatise tell an essentially different tale,—evidently owing to Mr. Hopkins's having gradually realized that the Sound *CCC* is *not* Deep enough for the Pedal Section of the Ordinary or even quite Small Sized Organ,—whether such Section be viewed in the *Abstract*, or as being required to yield Sounds *deeper* than the Lowest of the practically often Inevitable complete *Sixteen* feet Stop of the *Manuale*. Respecting the latter consideration, Mr. Hopkins's Paragraphs 850 and 892 should be examined; regarding the former, his Parags. 518, 1052, 1258, and 1265, and his pages 449 and 571, may be looked over with advantage.

The most striking of the foregoing passages is that on page 571, where Mr. Hopkins has propounded the extraordinary 32-feet-Stop Imitation already described in Answering his Paragraphs 904-920, and which device he has actually—on p. 572—recommended for *all Pedales that do not contain any 32 ft. Register.* This shows, conclusively, how *really Incomplete* he must have finally felt the CC-CCC Organ to be, as generally exhibited, and even as it had been presented in his own Model Schedules. Scarcely less significant is page 449, on which he has given the Specification of his own Organ at the Temple. This Instrument will be found among those cited at the end of Division *Instances General:* it is, therefore, here required only to add, that the 32 ft. Stop was applied at least as long ago as 1855,—the year in which Mr. H.'s Treatise first appeared; that the Organ then contained only *Twenty-six* Sounding Registers (with, however, Preparation for another); and that there cannot be the least doubt that its Pedal Section was designed entirely by himself.

A notable and excellent Specimen of a 32 ft. Register complete to GGG in a quite small Organ, is or was furnished in the *Hunton-Bridge* Instrument, cited almost directly after that of the Temple Church, to which the reader has just been directed. The Stop is a Gedackt (Small-Scale Bourdon) of superior make and voicing, added by Hill; and it does not, when properly used, in the least degree Overweight the remainder of the Organ.

....

Of Wrongful Objections to the GG Compass that have *not* been brought forward by Mr. Hopkins, there is but One that needs mention here. This is that the G *Key* does not afford a neat-looking *Finish* to the Manual.

—Simply as a Fact, this defectiveness in appearance is of course Evident. But the G Manual Key furnishes quite as Neat a Bottom as does either the *F*, *G*, *A*, or *C* a Top: and, seeing that for the latter Boundary, either *G* or *A* is now so very largely employed, it would be certainly better for *merely* the Appearance of the Manual that such G or A should be Matched by having a G as the Bottom Key. It is equally manifest that *F*, the *Alternative* of G, will afford as Finished a Manual-Bottom as can C itself.

[The actually *good* Point possessed by G as a Terminal note, in respect of the Skewing of the Manual Key Stocks, has been already specified in its proper place—as Advantage No. 4 of the GG Range—, at soon after the commencement of the present Division *Comparison.*]

CONCLUSIONS REACHED; AS INVOLVED WITH DEFINITE DIRECTIONS.

We may now consider that we have fairly grasped the following primary or fundamental CONCLUSIONS :—

—That the most accomplished and "Classical" Organists, particularly those accustomed wholly or chiefly to quite Large Instruments, are not likely to be the best Judges as to the most *Economically Effective* Compass for the Claviers :—That the Organ *Music* written to the CC-CCC Compass is, both in quantity and quality, far beyond the Compositions made exclusively for the same Instrument which accord with any Other Range :—That the CCC *Manual*, as a partial Substitute for a Separate Pedal Section, is entirely out of question :—That a distinct and complete Pedale is consequently always *compulsory* :—That, still, such independent Foot Clavier cannot *quite* equal the Long Manuale, in respect of Delicacy and Rapidity of Articulation (with the aid of special Palletts, or of the Pneumatic-Lever, where necessary); but that such an Extension of the Manuale *in addition* to a complete Pedale may be regarded as effectually barred by the great Expense then entailed :—That the Organ, being so largely (and so properly used in conjunction with the Human Voice—the aiding of Divine Service being incontestably the highest Instrumental function—, ought certainly to have its Fundamental Clavier Compass in *Harmony* with the Bottoms of the Vocal Range.

And hence it is that the Question, WHICH IS THE BEST DOWNWARD COMPASS FOR THE ORGAN? admits of no Actual Answer *excepting* One which involves a COMPROMISE. The most Economical and *therefore* really Best Pedale Bottom Range CANNOT be reconciled with the most Economical and therefore really Best Manuale Bottom Range, and with the huge existent mass of Music written on the assumption that such Manual Compass will be recognized and adopted *also* for the Pedal Bottom. And this is the secret of the Diversities, Inconsistencies, and Hostilities, which have been at various times exhibited in connection with the subject of THE COMPASS OF THE ORGAN.

One of the earliest practical Compromises attempted was that in the *Lincoln Cathedral* Organ. The Treatment there employed has already been stated, under the Side-Heading "*With Manual down to GG*" given shortly after the Range Table furnished in the Division *Instances General;* and some further particulars will be found at quite the end of such Table itself. To this it may be here added, that the Through Stops of the Pedale are a Sub-Bourdon of 32 feet tone, and an Open Diapason of 16 ft.; and that the Short Stops of the same Section consist of a Principal, a Chorus, and a Reed.

This Method, however, is quite inadmissible, because it creates a complicated Tie between the bulk of the Pedale Stops and the Coupler Great-to-Pedals, and thus leaves the Independence of the Foot Section almost as little secured as ever.

A Treatment formed of an *Inversion* of the Preceding, that is to say, One having the Chief Manuals descending to CC, and a GG or FFF Pedale the Reeds and Chorus of which ascend only to BB, is even *less* allowable; because, while the defect of the Involution of the Manuale with the Pedale will still *remain*, there will exist the *additional* disadvantage that "Classical" Compositions cannot be correctly Pedaled at all.

The Plan adopted in the *Rochester Cathedral* Organ, for which see almost directly after the said *Instance* Range-Table, may also be at once dismissed.

There are only Two other *Non-Solutional* Methods that are worthy of Mention here:—

The First of these consists in having the Choir Section Extending down to GG or FFF, the Great Section Ceasing at CC, any other Manual made either of the same Compass as the Great or not so Low, and the Pedal Section Descending to CCC. The Pedale Registers would be *rather* fewer in Number than if the Choir Section Finished on CC. The latter Manual would be Unitable to the Pedals by means of either a single *Composite (Returning)* Coupler, or of *two* Distinct *non-Returning* Couplers; while the remaining Manuals would be Couple-able to the Pedals in the usual way. *Specimens* of this Treatment, or of Approximations thereto, are or were—according to Hopkins—furnished (with GG Choir) in the *Gloucester Shire Hall* Organ (this having but one Coupler Choir to Pedals), and (with FFF Choir) in the Instrument at *Newark Parish Church.*

The Second of the Methods has the Compass of the Manuals the same as in the last named two cases, but with the Pedale Descending only to GG or FFF (Correspondent with the Choir), and provided with the Full number of Registers. *Only* the *Choir*-Section would in this instance need to be Couple-able to the Pedals. A *Specimen* of this Treatment (with GG Choir) seems to have been formerly afforded in the *Durham Cathedral* Organ,—it, however, possessing *also* a Coupler *Great* to Pedals.

Sufficient additional Description, etc., of these last cited Three Instruments also will be found in the foregone *Instance* Range-Table, and under the Side-Heads "*With Manual down to GG*" and "*to FFF*" following shortly after such Table. Study, however, is unnecessary, as either of the two Methods, though both are really cheap and effective—especially the Second—is quite out of question for any *New* Organ, because with neither treatment could there be got rid of the disadvantages that,—(1) the Left side Stop-Handles would be thrown Farther from the Player (and this for the sake of but one Manual), that (2) the Appearance would be bad, that (3) the Uniformity of the Manual Bottoms would be destroyed, and that (4) one single Length-Setting could never be made to serve for both the Great and the *Choir* Section Soundboards, Etc. Besides which, if the *latter* Manual were—as is often the case—absent, both of the Treatments would become at once impracticable; for (5), neither the Swell nor the Solo Section should ever be carried below *CC*, while, if the *Great* were to be extended to GG, the additional cost would be too large to admit of a separate Complete Pedale *as well.* Yet again, there is, with the *Second* of the two Methods, the *further* objection that (6) the Foot Part of "Classical" Music could not be played correctly. The utmost that we can say, therefore, is, that the FIRST of the two Treatments may be sometimes employed for the *partial Re-Modelling* of an already existing Organ.

The FINAL SOLUTION, *consequently, for the Normal or Typical Organ must consist in this:*—To adopt in all cases the note *C* as the Bottom one for every CLAVIER, both the Manuale (CC) and the Pedale (CCC), and for every SECTION also except, not infrequently (where money is limited), those which are *not* so much required to be *Coupled* to the *Pedale* (for the Supplementation of the latter): and, having thus rendered the Organ commensurate for the playing of "Classical" Solos, etc., to give the Compass what is really an Alternative *G* (or *F*) Foundation, so equally making provision for the performance of Music written in accordance with the Downward *Vocal* Range. In such "Vocal" use of the Instrument, its Lowest Five or Seven Keys, though not all the *Sounds* governed by them, will manifestly remain to a great degree Un-touched.

To secure the foregoing as regards the PEDAL SECTION, its Pipe-work, Etc., must first (of course) extend, as usual, *Through* to each end of its Clavier; and, furthermore, its Contents must include all the regularly Representative Registers,—because the "C" Manuale cannot ever really furnish even the Chorus of these (that is to say, the Twelfth, Fifteenth, Mixtures, and Trumpet of any Clavier going no Deeper than CC will all be one Octave too High to properly serve for the Foot Section). [If no Choir-Organ be present, and the Swell-Organ does not descend so Low as CC, there will exist still stronger necessity that the Pedal-Organ shall possess an ample number of Stops,—the reason being that there will then be *only* the Great Manual available for the Supplementation of the Pedale, *although* such Manual is not at all times suitable for such Supplementation,—even when the Great-to-Ped. Coupler is of the *Clear* kind (see at a little onward under *Definite Directions*).] The Pedal Section must then be so FURTHER Treated that its "Vocal" Portion, that is to say, simply the *whole* of its Range *except* its Lowest Five or Seven Semitones, shall become *as good as or even better than such lowest five or seven,* this being effected by Providing, *on* such *Vocal* Portion *only,* that which virtually constitutes *one or more Thirty-two feet Registers.* The actual method to be adopted is to CONTINUE (EXTEND) the Pipes themselves of one or more of the 16 feet Registers down to the GGG or FFFF sound, and then apply to them a Sub-Octave Coupler, which shall, at pleasure, add the 32 feet to the 16 feet sound as far as such Lowest G or F Pedal Key. If (I) but a *single* Pedale Register proper be present, its Coupler will manifestly be of the Ordinary kind; and there will as obviously be created a Cessation of *one Half* of the *entire* Pedal "Section" below such deepest G or F. If (II) *more than one* actual Pedale Register be present, it is only exactly or approximately the *Half* of them that should be so *Continued* and Sub-Octaved: and in this case, therefore, the Coupler will become one of the *Part* kind; while the Cessation below the G or F Pedal will be reduced to *Less than Half* of the Total Pedal-Organ.

If (III) the number of distinct Registers on the Pedale be sufficiently large, that Portion of them *not* Acted upon by the Part Sub-Coupler should be similarly *Continued* in an *Upward* direction beyond the Pedal-board; and Operated by a *Part Super*-Octave Coupler. Such Part Super must *never*, however, be present *without* the Part *Sub*-Coupler.

[Remember that the Upward Compass of the Pedal *Keys* is assumed to be Retained at its now accepted High point, in order that their "Vocal" Portion may be complete in its extent. The entire Pedal-board must be *Placed* rather more to the Left than it would be if treated as of exclusively CCC Range (see at just onward).]

This Virtual Inclusion of the 32 feet Stop on the Pedal Section should be assisted by a suitable Treatment of the MANUAL SECTIONS, so that they also shall definitely recognize the G or F Bottom, and be at the same time better enabled to Supplement the Pedale Registers,—as may be required. To these ends the Swell *Section* will be often, and the Solo *Section* still more frequently, Finished on Gamut G, or sometimes on FF (the loss in respect of these Manuals' being then unable to Supplement the entire Pedal Clavier is rendered slight by the fact of their never being really adapted for such Supplementation at all); and the remaining Manual Sections will have sundry of their *Registers* Ceasing at Gamut G or FF. The Great-to-Pedale and some other Couplers will be, *preferably*, of the just mentioned *Clear* kind.

By these Treatments of the Manuale and the Pedale, the vital Economy of the GG or FFF Compass, with its virtually of 32 feet Stop included naturally, will be at once secured, and this in combination with the greatest degree of effectiveness. The dispensing with the Sounds of from CCCC to EEEE or to FFFF♯ will allow of the 32 ft. Register's being supplied in *Closed* Pipes without their descending too low for certainty of their *deepest* ones' being of real use; and thus no resort to the *Acoustic* Device—generally doubtful in its result—will ever be *necessary*. In fact, however, the 32 ft. Stop can be, in the majority of cases, an Open one,—if desired. The Amalgamation of the C Bottom with the G Bottom will of course *Stereotype* the really-*Too-Wide*-Compass [CCC] Pedal Clavier: but this Evil is unavoidable. The making of the Couplers Great (or other Manual) to Pedal to be of the *Clear* species will yet again benefit the Supplementation of the Pedal Section. Whenever the Pedal-board is being Played "Vocally" the Notes employed will, manifestly, be so comparatively High that *no* Coupling of the Manual to the Pedals will be of much use, except for *Pedal Obbligato;* but the outlay saved by the Shortening of Manual Sections and their Registers will be so considerable that the Pedal Section can be *always* made large enough to render the Foot Part *sufficiently* independent of aid from the Manuale.

Perhaps the reader will now exclaim, "A Compromise indeed"! But is not almost all Existence a Compromise,—in some sense? Look—to compare

Stupendous things with Small—at our own Solar System, and note how its inaccuracies and irregularities have been made, by its Divine AUTHOR, to balance and correct each other.

As the Right-and-Left Position of the Pedal Clavier is so mixed up with the Solutional Definition of Compasses just stated, a few words on such position must here be given:—

First, however, the student should turn to what was said, under the *Remarks* on Advantage No. 10 of the *GG* Clavier Bottom, in Division *Comparison of Compasses.*

With the *CC of the* [*CCC*] *Pedals placed perpendicularly beneath the Middle C of the* [*CC*] *Manual,* the entire Pedal-board will come almost exactly *Central* with the Manual when the former ascends to *Tenor D* and the latter to F^3. It is to be observed that here both of the "standard" notes are of one *same* name,—C. This is the Position *Resolved* upon at the *Conference* on Organ Construction held in 1881 under the Direction of the College of Organists,—such a Decision having apparently been arrived at mainly on account of the said identicity in the standard notes. Such a Placing is, however, open to the fatal objection of throwing the "Vocal" Portion of the Pedal-board too much to the Right: for its top (Tenor F) Pedal,—the octave above which is *sometimes* found in the Vocal Bass Part, ought *certainly* to be brought *as near* to the Player as is its lowest C (CCC) Pedal,—which is at least Five Semitones *deeper* than the octave below the Vocal Bass bottom. The Conference did not in any way touch upon this matter of the "Vocal" Range of either the Manual or the Pedal Clavier, and the Central points resultant therefrom,—evidently not apprehending the connection at all; therefore—as such Range constitutes a most important factor in the calculation of the correct Right and Left Position of the Pedal-board—this their Resolution must be regarded as destitute of any real value.

With the *CC♯ of the* [*CCC*] *Pedals directly beneath the Middle C of the* [*CC*] *Manual,* the Pedal-board will, if of 2¼ inch Scale, come nearly *Central* with the Manual when the former rises to *Tenor F* and the latter to G^3,—which two notes may be looked upon as the *Normal* Upper Boundaries. The extreme top and bottom Pedal Keys will therefore be now brought *almost equally* near to the Player. With this Posit the "standard" Pedal, CC♯, is the one which is either exactly or nearly at the middle of its Board: and this gives the Advantages (1) that the precise location or "lie" of such Pedal, and consequently of the entire Pedal-board, will remain almost or quite un affected by any *Radiation* of the latter, and (2) that no Variation in the *Scale* of the Pedal Clavier can cause much difference in the relative side-ward Projections of the Bass and the Treble ends of such Clavier.

This CC♯ under C Position is to some extent Employed in England,—as by *Willis* (the Organ in *Hoddesdon* Church, Herts, may be cited); and has been —partly at the Instigation of the present writer—more largely Adopted in America,—as by *Hook and Hastings* (of Boston).

With the *DD of the* [*CCC*] *Pedals perpendicularly under the Middle C of the* [*CC*] *Manual*, the Pedal-board will come practically *Central* with the Manual when the former ascends to *Fiddle G* and the latter to A^3. The "Vocal" Portion of the Pedal Clavier will thus be brought more directly beneath the Player,—which is, obviously, in accordance with the Solutional Treatments just Enjoined. An Advantage will be added by the circumstance that the "standard" Pedal Key is now the Middle one with the *average* Upward Range of the Pedal-board. On the other hand, however, the bottom *Pedals* —though not, with the writer's Shortened 32 feet Ranks, the finest *Notes*— will be thrown rather beyond the Organist's reach: the Pedal-board will, in fact, here fall in *all* cases more or less to the Left of the Manuale, *excepting* either when the former extends as high as Tenor F *while* the latter finishes at below F^3, or when the Pedals ascend as far as Fiddle G *while* the Manual does not rise above A^3;—neither of which Conjunctions, the first of them especially, is really Admissible.

This Position of DD beneath C was, according to a Mr. *T. Casson*, writing in the *Musical Times* of June 1881, advocated by Mr. *Best*, at a date seemingly at least as early as that of the Organ Conference just mentioned; but was not, so far as I can ascertain, even alluded to in any of the Utterances there made. Such advocation indicates that Mr. Best, constantly performing as he is upon "32 feet" Organs, and being consequently enabled to Pedal all his Vocal Basses in Unbroken strictness, has realized that this latter does enforce an *Inclination* of the feet towards the Right-hand side, even with the Pedals placed at CC♯ under C.

With the DD♯ of the [*CCC*] *Pedals directly under the Middle C of the* [*CC*] *Manual.* When the Pedal-board is as wide as is involved with the extending of its Compass from CCC to Tenor F it is manifest (see p. 13) that the Player should be seated *exactly* or *nearly* at its Central point; and, such point falling, as obviously, on the *DD♯* Pedal, it follows that such Pedal would at first thought appear to be the correct one for being, with the C to F Ped. Range, brought beneath the Central point of the *entire* Manual,—say beneath its *Middle* E^1. But there exists the counter consideration that the Organist will *not* necessarily be seated at the centre of his entire Manual, but rather at the centre of its "*Vocal*" Portion; and, such Portion being assumed as extending from Gamut G to F^2, and the central point of this being Middle C^1, it results that it is preferably the *latter* note which should have the DD♯ Pedal brought beneath it. And thus would the correctness of the *DD♯ under Mid. C* Position seem to be demonstrated;—especially when it is remembered that (as the reader has already seen) the CCC to Tenor F is the *Normal* Pedal Compass,—also that DD♯ is the Normally central Pedal Key (being the *Mean* between the C and G Bottoms, see for this again under Advantage No. 10 of the GG Range, in Division *Comparison of Compasses*),—and that there exists no *obligation* for the Player to be seated at the actual Centre of his Manual.

I do not, however, really *recommend* this DD♯ under C Position, for it would manifestly throw the Pedal-board still farther to the *Left*, and quite too much so for CCC-Pedale Instrumental Music; and such a one-sidedness would become still more palpable whenever the Manuale ascended to C^4. But what I have now said shows conclusively that Pedal Keys placed with their *CC♯ under Middle C cannot possibly* be too far to the left; for, certainly, their "Vocal" Boundaries can claim to be consulted to such an extent; while, as unquestionably, the Final Position of the Pedals should be determined in connection with their "Full" (Two and a Fourth Oct.) Compass, because, otherwise, when the latter reach is arrived at, it may be discovered that if the Player be placed correctly with respect to the Manual, the Pedal Keys at one end will be too far from him. The doubt is, therefore, as to whether the *CC♯* beneath C will bring the Pedal-Clavier far *enough* to the Left.

On the whole, as even the DD under C Position will entail a sentient Left-ward excess of Pedal Projection beyond the [CC] Manual, and as the CC♯ under C seems to be as Left-ward a Position as *has been* employed, perhaps it would be the best course to settle Finally upon the latter as the Correct and Imperative Planting. But, for decency's sake, let us hear no more of *CC* under C,—which, when the Player is seated at the centre of the Manual "Vocal" Range, renders the Tenor F Pedal-Key (to say nothing of the Fiddle G Ped.-Key) practically out of his reach, while the CCC Ped.-Key—which is considerably *farther* beyond the common Bass Vocal Limit than is even the Tenor F Ped.-Key—is yet brought palpably *nearer* him than is such F Pedal.

It should be repeated, that when the Lateral Position of the Pedal-board has been once settled, such Position must *never* be varied. And thus, any *given* Pedal will *always*, if present at all, occupy one same point in lateral relation to one same Manual Key; and the Variations in the Upward Compass of the Pedals will furnish so many actual *differences* of their Boards' Lateral projection beyond the Manual Treble.

....

Owing to the Range of the Pedal Clavier's having become so Extended, it is now always necessary to set the Pedal-Keys themselves as *Close* together as is possible without the spaces between them being rendered contracted enough to imperil the "cleanness" of the Pedaling.

The author has met the difficulty of this desideratum by making each Pedal Key as *Thin*—half an inch—laterally at its Top edge as is practicable; and, in order to prevent the resultant more rapid wear of such Edge from being really objectionable, having each edge Portion to consist of a distinct Screwed Slip, renewable with the greatest facility; while, for the preservation of lateral rigidity, the under part of each Key is made as thick as is possible without endangering its touching its nearest neighbour. By such a Form, the 2¼ inch Scale (by Scale is here meant the distance from any Natural to the one next it)—insisted on by the present writer—can be employed, with yet there being left the same space between the Edge or Playing portions of the Keys as is given by the 2⅜ inch Scale (Resolved upon by the Organ Conference before-mentioned) in conjunction with Keys of ⅝ inch thickness,—which ⅝ in. is yet ¼ in. too thin for the attainment of real lateral firmness. This point also, viz., the relation of Pedal Scale to Pedal Key Thickness, seems to have been virtually ignored by the said Conference; and, as the consequence, their 2⅜ inch dictum must likewise be regarded as valueless.

The 2¼ inch Pedal-Scale possesses the additional advantage of bringing the Pedal-board, if of commensurate Range, slightly more *nearly* central with the Manual when either the Pedal CC or CC♯ is set under the Manual C.

....

At this stage again refer to what was said, as to the *Pitch* Assumed, at the end of the *Preliminary* Division.

DEFINITE DIRECTIONS, CHIEFLY FOR DOWNWARD COMPASS, AND TREATMENT CONNECTED THEREWITH; INCLUDING COUPLERS.

MANUAL SECTIONS AND THEIR COUPLERS.—The KEYS of ALL Manuals should in *every* case extend throughout to the CC, and the Section, if Short, be always "completed" by *Borrowing* from some other Section. An additional reason for so treating the Key-board is furnished by the desirableness that all Manuals should present to the eye an *uniform* Bottom,—as for affording one same Note at which the Standard Pipe Lengths may be taken.

The ATTENUATION of the Manuale Bass, by the downward Curtailing of one or more of its deeper Sounding Stops, has already been seen, under Division *Comparison of Compasses*, to be to some extent more advisable with the Organ of *CC-CCC* Range than with that of *GG*, because, with the latter Instrument, the Duplication of such Stops by others on the Pedale is not so great. It is now to be observed that such Attenuation will be expedient in *all* CC-CCC Organs except those possessing a Pedal Section which is large enough to do *wholly* without aid from the Manuale. It is manifest that so ample a Pedale as this will rarely be actually achievable.

Whenever an entire Section does not descend beyond Gamut G or FF, and there is no other suitable Section present by which such Short one may be "Continued," it is desirable that the latter Section do have one or more of its Registers finishing on *Tenor C*, for the purpose of softening the loss caused by such cessation at G or FF.

Whenever a Section does not extend below Gamut G or FF, but *is* Continued by Acting upon another Section, it will be *still* advisable that the Curtailed Section do have one or more of its Stops ceasing at Tenor C, *unless* the Borrowed-from Section be as *Loud* as is the Shortened one. The object of here retaining the Attenuation is the better Matching of the one Clavier by the other.

In all cases where funds are limited, it is unadvisable to carry the ***Manual*** 16 *feet* Stop or Stops lower than the Gamut G or FF Key, unless either the Pipes are wanted as Displayed ones, or the Organ be really Large. The cost of the Notes below the FFF sound is, remember, very great; and, even when obtained, they require much Room, and cause risk of Robbing the Wind-Groove, or of giving a Grunting effect. The proper development of the ***Pedal*** Section does at once away with any function of the Manual Doubles for furnishing the Foundation of the Instrument.

In all cases where a Short Register Borrows its *Bass* from that of a second Register, there needs be no special care exercised in the *Matching* of the sounds at the Junction, *provided* that the Short Stop descends as far as Gamut G. The reason here is that as the Keys below this note are so comparatively little used by the Hand, the point of the junction will not often be passed, *except* when the Manual is United to the *covering* sounds of the Pedal-Organ.

For the *Choice between* Gamut G and FF as Terminal notes, see what is said just onward with reference to the *Swell Section* and the *Solo Section.*

Under special circumstances it will perhaps be advisable to have one or more of the Registers *Shorter* than even *Tenor C.*

Great Section.—The GREAT SECTION should *always* Descend to, and Finish on, **CC**. In First Class Organs every or nearly every REGISTER ofthe Section should so descend. In all other cases one or more such Stops as the *Double Diapason*, a *Viola*, a 4 *feet Flute*, a *second Mixture*, and so on, should be Shortened to GAMUT G, or sometimes to DOUBLE F: while a smaller number, such as a *second Open Diapason*, a *Dulciana*, or a *Clarinet*, should Cease at TENOR C. These Downward Attenuations will be especially effective in improving the *Supplementation* of the fair-sized Pedal Section, because of the generally *strong* character of the Great Section Registers, and therefore of those of them which are most naturally existent in *Duplicate* upon such Pedal Section; and the chance of such Duplications' becoming actually palpable is manifestly increased by the comparative frequency with which these two Sections are used *United.*

The COUPLER for Uniting the *Great* to the *Pedal* Clavier should, in all ordinary Organs, be one of the CLEAR kind,—already mentioned. This species of Coupler has been devised by the present writer to meet those cases, legion in number, where the Pedal Section will *not*, either by itself or in combination with the Manual, yield a satisfactory Bass for *every general* effect. The construction of the Coupler is such that it Acts so as to be "Clear" (hence its name) of some Clavier that would otherwise at certain times alter the effect of such Coupler by itself's becoming United in with it. Thus, the Coupler *Great to Pedale*, as at *present* made, involves, directly the *Swell to Great* is *also* drawn, the addition of such *Swell* to the sounds which are already placed upon the *Pedals;* and this is often bad, for the *three* Sections then united will be too strong for many Manual effects desired. And the Swell *alone* Coupled to the Pedale will rarely be satisfactory: while the *Choir* Section is frequently absent. The *Clear* Coupler Great to Pedals will be in this case so Contrived that, when drawn in *conjunction* with the Swell to Great, such Swell will *not* be United to the Pedals (unless the actual Swell-to-Pedale be also drawn); and thus, at once, the difficulty is solved. [Other only a little less useful Mechanical Stops of this kind are the Coupler Great-to-Pedale *Clear* of the *Solo-to-Great;* the Coupler *Swell-to-Pedale Clear* of the Solo-to-Swell; and the Coupler *Choir-to-Pedale Clear* of the Swell-to-Choir.]

This Clear [of Swell] Great to Pedale Coupler (the Clear one most required) is—with the Order of the Manuals as is at present Accepted—neither more complicated nor more expensive than when of the ordinary kind. The "Clearing" Structure consists merely in (1) the making the Swell-to-Great Coupling to be of some form (the *Drumstick* is preferable) which operates between the actual *Keys*, and in (2) the applying the Great-to-Pedal Coupling to the *Action* instead of to the Key-tail. [The same non-increase holds good with the aforesaid Clear Swell-to-Pedale Coupler, and for the same reason, viz., that the Coupled Manual is located *next above* the Manual *to* which such Coupling is made. With the said Clear Choir-to-Pedale Coupler, the Mechanism is less simple, owing to the circumstance that the two Manuals which are Concerned are *separated* by a third one.]

Whenever this Coupler Great-to-Pedale Clear of Swell-to-Great is employed, the Great Manual will at once become of real use in Supplementing the Pedale: the Swell Manual will, in fact, be then rendered, by comparison, almost valueless for such Supplementation. Therefore, as the Pedale alone ought to yield sufficient Bass for all Softer Combinations, the presence of this [Swell] Clear Great-to-Pedale should be *always* secured; and the providing the Swell-to-Pedale will then be quite a secondary consideration.

In a similar way, and for similar reasons, the Coupler Great-to-Pedale should, wherever a *Solo* Clavier is present as a *Fourth* Manual, be *generally* constructed Clear of the Coupler *Solo* to Great.

The *additional* Advantage given by any Clear Coupler, in that whenever the Excluded Manual is of Short Compass the *Break* of its Cessation is so cut off at the same time, will be directly demonstrated.

Swell Section.—The REGULAR or Proper Compass for the SWELL SECTION also is to be Set at **CC**; and this Boundary should be employed in *every* Organ, of whatever Size, that is of really *High* class Quality. CC should likewise be attained to in the Swell of *every* Organ of *Four* Manuals (irrespective of quality) that possesses a *Solo* Section which itself descends to CC. The Swell Range should *generally* be CC when the Manuals are as many as *Four* in Number. The Swell Compass should *often* be CC where the Pedal-Section Sub-Octave *Extension* is carried *below* the GG Pedal Key (for the reason, see just onward, under PEDAL SECTION AND COUPLERS). CC should be *sometimes* adopted for the Swell when the Manual Sections are Great, Swell, and *Solo* only,—the reason being that, then, the Longer Swell is useful for partly supplying the place of the *Choir*-Section in Supplementing the Pedale.

If the Swell Section does not, as a whole, descend to the CC, and no *Choir* Section be present, there should, if convenient, be some ONE of the Registers of such Swell Continued down to the CC. Such Register should, if possible, be one of *Representative* Character,—as a *Gamba* or other *Reedy Flue;* and it will generally be preferable for its Continued Portion to be placed *outside* the Swell-Box.

For STOPS which may Finish on DOUBLE F, GAMUT G, and TENOR C, see first what has just been said with the *Great Section.* The Stops that should preferably be made "Short" on the Swell Section are the *Double*—especially when of the *Flue* kind—,the *Open Diapason*—even when there is but one on the Section—, a *second Flue* 4 *feet,* a *second Mixture,* and the *Oboe.* The carrying of the Swell-Manual OPEN DIAPASON below *Tenor C* should USUALLY be CAREFULLY AVOIDED, even when there is a *second* 8 feet Flue Stop—either Open or Covered—on the same Clavier, *unless* the Section is really large,—say having as many as *Thirteen* Sounding-Stops.

In *all* cases where Funds are really limited, excepting when as above stated, or save where the Pedale Sub-Extension descends beyond the GG Pedal Key, the Swell SECTION should, as a whole, CEASE BELOW GAMUT G. This *sometimes* holds good, if for the *very cheapest* Instruments, even where the Manuals *are* as many as *Four* in number (only that, with such a Swell, the *Solo* Section likewise will not descend below Gamut G. The *Choir* Section, remember, will always go Through). Where money is not *quite* so scarce, or sometimes when a Gamut G *Solo*-Section is present also, or occasionally when the *Pedale* Sub Extension goes below the GG Ped. Key, the Swell should have DOUBLE F substituted for Gamut G: this will not only ensure the Swell's comprehending the *entire* Vocal Range, but will, supposing that the Pedale Extension *does* Finish on its GG Key, soften the Break of the Cessation at the GGG Sound. The Swell Section must never, in a Four Manual Organ, be of *Shorter* Compass than is the *Solo* Section. It is never recommended for the Swell to cease at *EE.* The Swell Section must NEVER be, as a whole, SHORTER than *Gamut G, however* small is the size of the Organ; but a Short Swell may have some of its *Stops* finishing on *Tenor C,*—just as if such Swell, as a whole, descended to CC.

The LOWEST KEYS of a Short Swell Section must in every case Act on the *Choir* Section, if the latter be present. If the Choir be absent, but with its place supplied by the *Solo*, the Swell Keys should generally operate the *latter* Section, or some appropriate Stop or Stops thereof. If both the Choir and the Solo be absent, and there be no Register Continued to CC on the Swell, such Swell Keys must act on some Representative Stop or Stops of the *Great* Section; but must *never* operate the *entire* Great.

[Whenever the present Section does Finish on Gamut G or FF, its Swell

Box should be made, if possible, as Wide from Right to Left, and as Lofty, as when the Section descends to *CC*. A partial *Diminution* of such Box Width may, however, be allowed when it has the Through Continuation of a Register placed *Outside* it. The Swell SOUNDBOARD and its *Chest* should preferably be always as Long as if its Compass were to *CC*, that is to say, be of the same length as the *Great* Section Soundboard.]

If the COUPLER *Great to Pedals* be made *Clear* of the *Swell to Great*, and there be *no* Coupler *Swell to Pedals*, nor any one Uniting the Swell to either the Choir or the Solo Section, the Swell Section will of course be ENTIRELY cut off from the Pedal-board, and therefore no Break resulting from any Shortness in the Compass of such Swell can ever be conveyed to the *Foot* Part. As consequently, when the Swell does not descend through, and especially if it have not even a single Stop so descending, it will often be a good plan to DISPENSE altogether with the Coupler Swell to Pedals,—and thus save its room and cost. Concerning the possibility of a Short Swell's Cessation's being conveyed to the Pedal-board through the medium of the Coupler *Swell to Choir* or *Swell to Solo*, see the Prevention stated just onward at the end of Side-Head *Choir Section*. In the same way the Coupler Swell to Pedals, *when* present, should always be made *Clear* of any Coupler *Solo to Swell* if such Solo Section finishes Short of CC: the Swell-to-Pedals Coupler had, indeed, be better so made Clear of the Solo in *all* cases, *whatever* be the Compass of the latter Section. The Coupler *Swell to Solo* should *never* find admittance unless such Solo occupies the *place* of the *Choir* Manual (the latter itself being absent).

Choir Section.—The CHOIR SECTION, like the Great, should *always* Descend to, and Finish on, **CC**; and, in the Highest class Instruments, should have every or almost every STOP so descending. For Stops Ceasing at DOUBLE F, GAMUT G, and TENOR C, look first at what is said just back under the *Great Section;* the chief differences to be observed in the Choir being,—that its *Double* Stop should never descend throughout until its Section has become really *large*,—that such Double may sometimes Finish on *Tenor C* when its Section possesses also a strong 8 feet Flue which goes as low as or lower than Gamut G,—that its 8 feet Open Flue, even when every other 8 ft. on its Section is either Closed, or otherwise Soft, or is a Reed, or does not extend below Tenor C, may cease at *Gamut G* or *FF*,—that a *second* 4 feet Flue needs rarely descend through,—and that an *only Reed* may often be Short of CC.

The *reason* why the Choir, though essentially the "Vocal" Section, must always go down to CC is, the especial value possessed by this Manual in respect of *Supplementing the Pedals*,—unless only a *Part* of some other Manual Section is employed for such supplementing, which Partition is not to be generally advocated.

There must in ALL cases be provided a COUPLER for Uniting the *Choir* Section to the *Pedals*. If the Coupler *Swell to Choir* (a most valuable Adjunct) be also present, it will be quite as well for the Coupler *Choir to Pedals* to be made *Clear* of such Swell-to-Choir: and this Clearness will be particularly desirable whenever the Compass of such Swell stops *Short* of CC, the reason being the prevention of the Swell Cessation from being conveyed to the *Pedals.* Whenever the Solo Section fills the place of the *Choir* Section, while the Manuals are only Three in number, the Couplers *Solo to Pedals* and *Swell to Solo* become equally essential, and the former of these should, in the same way, be made *Clear* of the latter of them.

Solo Section.—The REGULAR or Correct Compass for the SOLO SECTION also is to be Set at **CC.** Such Depth, however, is never really *Binding except* for Organs of the *First* Class, and for those, of *any Quality,* in which the Solo occupies the place of the *Choir* Section, while there is *no* Fourth Manual present. But the CC Range is *sometimes desirable* for the Solos of those Instruments, again irrespective of Quality, which, *while* possessing *Four* Manuals, have their Pedale Sub-Octave Continuation going *below* the *GG* Pedal Key. (The reason for this last desirableness is given directly onward, under Side-Head PEDAL SECTION AND COUPLERS.)

With regard to Short STOPS, see what is said at a little back in connection with the *Great Section;* remembering, however, that *very few* Solo-Section Stops should Finish at *above* GAMUT G, and that *every one* which does so Finish should be "Grooved" into some suitable Register that *is* continued to such G. These obligations hold good *whatever* is the general Compass of the Solo Section.

It is not, in the Solo, so necessary to have some ONE Register Continuing *throughout* to the CC; and, where funds are scarce, such Continuation should *never* be made.

In *all* Organs *except* those of *quite* the Highest Quality, or those as above stated, the entire Solo SECTION should Finish on either GAMUT G or DOUBLE F. The latter Compass is of course preferable in the abstract, and is always *Binding* (unless the [Solo] Descent be to CC) when the *Pedale* Sub Extension goes below the GG Pedal, but [FF] is never to be employed in any *Four* Manual Instrument of which the *Swell* goes no Lower than Gamut G,—the cause of such prohibition being that with such Number of Manuals the Solo must never descend *beyond* the Swell. It will now be seen that *CC* should be shut out for the Solo Section *until after* every of the *other three* Manual Sections has been carried down to such CC, and *every other essential claim* of Downward Compass has been satisfied. The reason for this more frequent Shortness of the Solo Section is, that as its Sounds are intended primarily for the imitation of *Vocal* Solos, it will—manifestly—not be generally worth while to carry its Stops below the Compass of such Voices. For exceptionally deep Melodies there will, remember, always be the Great Manual, and very often the Choir and the Swell Manuals also: in these cases the Solo Manual will be available for the *Accompaniment.* The Continuing of the Solo Section to CC will be *especially* unnecessary where there exist *Three* Manuals *besides* which each descend to such note. Neither DOUBLE E, GAMUT B, nor TENOR

C is really admissible as the Bottom Boundary of any Solo-Organ: the last named note has, however, been occasionally so adopted,—see the *Newark* Instrument, already given in the Table under Division *Instances General.*

The Continued KEYS of a Short Solo Section should, in all cases, be made to act upon the *Great* Section, or upon a suitable portion thereof.

[The SOUNDBOARD of the Solo-Organ ought usually to be constructed *Long* enough for even its *Top*-most Bars to be sufficiently *Thick* to allow of the Palletts' being of the *Rocking* form. The Shortening of the Solo Compass will facilitate this. (The Rocking Pallett differs from the ordinary one in being *Longer*, in order to have its Back portion *Bevilled* away so as to form the *Cover* of a *flexible Fold*, which unites it to the Soundboard Grating.)]

The COUPLER *Solo to Pedale* will be required even *less* frequently than is the Coupler *Swell to Pedale;* and *especially* will such a Coupler of the Solo be well Absent where the latter's Section stops *Short* of CC. *With* such Absence, and the Coupler Great or other Manual to Pedale constructed *Clear* of the Coupler Solo to Great or to other Manual, it will of course be impossible for any Cessation-Break of the Solo Section to be ever conveyed to the *Pedal-board.* (*N.B.:* in the present Paragraph it is to be understood that by *Solo Section* is meant one to a *fourth* and top-most placed Manual, and *not* a Solo Section that is substituted for a Choir Section.)

Whenever the Solo Section *is* present without the Choir Section, the Coupler Solo-to-Pedale manifestly becomes at once *Essential:* and such Coupler is, as regards being made of the *Clear* kind, then under exactly the same rules as if it were a Coupler Choir-to-Pedale; see just back, under the *Choir Section* portion.

Other Manual Sections.—The best Compass for any OTHER Manual Section can be easily deduced from what has now been said concerning the Orthodox English Four.

PEDAL SECTION AND ITS COUPLERS.—The PEDAL SECTION *Proper* should in *all* cases Descend to **CCC,** and the Pedal *Clavier* there Finish.

See now first the *Finally Solutional* Definition given soon after the commencement of the present *Division.* The most Suitable REGISTERS for the Sub (and Super) Octave Treatment will be sufficiently evident on a perusal of the *Exemplary Schedules* furnished at a little forward. There will, remember, always exist, even *without* the aid of the *Super* Octave Coupling, an adequate amount of *Continued* Sound to properly *veil* the Break of the Cessation at the lowest E or F♯ Pedal. The combined *Part Octave Couplers,* like the *Clear* Coupler, are an invention by the present writer.

The actual *Note* at which the *Sub-Octave Extension (Continuation)* Ceases should be, in *all ordinary* cases, **GGG,**—Five semitones below the bottom Pedal: this will fairly cover the downward *Vocal* Range. Where, however, the additional Space and Funds are possessed, the Sub-Extension may well descend to **FFFF,**—the Builder bearing in mind what has just been said, under the Heads *Swell Section* and *Solo Section*, as to those Manuals being in such event more freely *Piped* down to CC.

[The REASON for the foregoing more frequent descending of the Swell or the Solo Section to CC is, that as the Cessations of the Pedale Sub-Augmentation (Extension) and of a Shortened Manual are, in using such Pedale with such Manual Coupled thereto, naturally more felt when both of the Cessations occur on one *same* Note, some of the increased funds may well be employed in *Divorcing* such Points of Ceasing. (The *Alternative*, viz., the retaining of the *Swell* or the *Solo* Section at Gamut G, while making the *Pedale* Sub-Extension to go Lower than the GGG sound, is, obviously, *never* to be tolerated.)]

Where room and funds are still more ample, the Sub-Octave Extension may be carried down to *CCCC*,—the complete Octave below the Pedal-board.

[For the *Upward* Compass of the *Super*-Octave Continuation (Extension) see at a little forward.]

The *Constructional* Treatment, of the Windchests, Etc., assuming the ACTION form of Working to be adopted, will be as follows,—for the Combined Sub and Super Octave Extensions.—There must of course be a Pair of *Palletts* to every Pedal Key,—throughout the entire Range of the *Pedal-board;* but both Palletts can usually be placed on one same Groove,—the latter being then Partitioned: a pair of *Grooves* to each Pedal Key may, however, be found necessary in *some* cases. No Partitioning of the *Wind-Chest*, nor making of the entire Chest and Sound-board in two or more Portions, will ever be required so far as the *Part-Coupling itself* is concerned. The *Bellows* must be *nearly* as large as if the Pedale contained *twice* as many Sounding-Stops as it actually does. There will be the usual Fixed Key-Action, here operating each Pair of Palletts at once; and, in addition, *each* Part-Coupler will have a Separate Set of *In-and-Out* Action, one Set operating *Sub*-wise upon its proper. Pallett of each pair, and the other Set acting *Super*-wise upon the remaining Pallett of each pair.

The Treatment for a Part *Sub*-Octave Coupler *alone*, or for an *Ordinary* Sub-Octave Coupler—to the *Entire* Section—, will be sufficiently seen from the foregoing.

Either of the last three *Treatments* now indicated can, if preferred, be achieved by WIND Communication instead of by distinct Sets of *Key-Action.*

Where any obstacle is found in the way of Applying the foregoing Sub-Octave Coupling Device, one or more *actual* 32 feet Stops may sometimes be provided, but carried only partly Through (see p. 67), and having their Bottoms either *Borrowed*, or altogether *Wanting*. Or, one of two *Sixteen* feet Stops—even the Open Diapason in a small Organ—might be made similarly Short, and have its Bottom Borrowed from the remaining [16 ft.] Stop. Such Short Registers would finish on the LOWEST G OR F Pedal,—as was the case with the Sub-Octave Coupler; see again the Rules just given.

DEFINITE DIRECTIONS FOR UPWARD COMPASS, AND TREATMENT CONNECTED THEREWITH; INCLUDING COUPLERS.

MANUAL SECTIONS AND THEIR COUPLERS.—It has been already stated, and is to be entirely accepted, that for the Upward Boundary of *all* Manuals contained in *any* one Organ, EXACT UNIFORMITY is *Absolutely Binding*, in all Instruments and at all Times; and this, notwithstanding any consideration respecting a *Super*-Octave Manual *Coupler*.

F^3.—This is the lowest Top Note that should *ever* be allowed. *It*, however, may be *freely* employed in *Chamber* and other *small* Organs, and in other cases where Funds are very *limited*,—always excepting Instruments that are required for *Practice*, as in these the Compass may well extend high, be the space or cost *ever* so restricted.

G^3.—This may be regarded as the proper and best Compass for *general* purposes. It is cheap; and will ensure a clear Octave higher than the topmost note of all ordinary Vocal and Sacred Music. G^3, remember, furnishes the point *above* which the Pipes of any 2-feet Stop ($G\sharp^5$ and Upwards) are practically useless. It is to be added that the College of Organists' Conference, mentioned at some little way back (under the Examination of Pedalboard Position), Resolved upon G^3 as the *lowest* Compass permissible: but (as will, at the same place, have been seen), the Debates of this Assembly were by no means Exhaustive in their character, and therefore the Conclusions to which they led are not necessarily to be accepted as *Final*.

A^3.—This Note may be freely employed for the *Better* class of *Sanctuary* Organs, and for *Concert* Organs which *cannot* well be carried up to C^4. Bear again in mind, however, the consideration of *Practice's* sometimes demanding a Higher Range. The 2 feet Stops or Ranks had better, for the Two Highest Pipes, either Die out or Return.

C^4.—This Compass should be reserved for *Concert* Organs *generally*, for the *Best* class of *Sanctuary* Organs in *some* cases, and for Organs of *any* kind in which a really high Range is desired for the sake of *Practice*. But so elevated a Boundary should, remember, be adopted *only* when Funds are commensurate. The presence of a *Super-Octave Coupler* on or from a C^4 Manual adds in a very marked way to the effectiveness of this Compass, because, as such an altitude gives about a clear Octave and a Half above the average Vocal Limit, it will be rarely that the Break at the cessation of the Coupled Octave can become palpable. (It is, however, not to be forgotten that even the G^3 affords an Octave beyond the "Vocal" Boundary). The Pipes above the G^5 sound had better Die out or Return, as with the preceding Compass.

Sub-Augmentation Extended down to the *FFF* Key,—*provided* that both, or three, or all the Manual Sections descend below *Gamut G*,—not else. (5) More *Couplers* applied. (6) The Solo Section Completed to CC *while* there are *three other* Manual Sections descending to such note. (7) The Pedale Sub or Super Augmentation, or both of them, carried the entire *Octave* beyond the Pedal-board Boundary. (8) The Pedale Sub and Super Augmentations Carried throughout as *separate* complete Registers, and Part Couplers abolished on such Section. (9) Any required alterations made in the Short Registers so as to better *harmonize* them with the Registers into which they are "Grooved." (10) Some, or all, of the Short Registers carried down throughout.

From what has been furnished in the present and the preceding *Divisions*, the reader ought to be able to easily draw up, for any Organ of reasonable size, a Schedule which shall embody the actual *Maximum* of Economy in respect of every point of its COMPASS.

REFERENCES TO FURTHER INFORMATION.

Some FURTHER INFORMATION on the Compass of the Organ, and on matters connected therewith, will be found in the following Publications,—among others. The *order* here observed is again that of relative importance, with the *chief* Work placed the *first*. (Two or more of them have been already referred to.)

THE ORGAN; ITS HISTORY AND CONSTRUCTION. By *E. J.* (now Dr.) *Hopkins*, and Dr. *E. F. Rimbault*. Published by Cocks and Co., 6, New Burlington Street, Regent Street, London, W. Price of Third Edition, 31*s*. 6*d*., inclusive of Postage. A Copy may be consulted free daily at the Patent Office, Southampton Buildings, Chancery Lane, London, W.C.

The strictly Historical Part, by Dr. Rimbault, contains some items on the Origin, etc., of COMPASS. In Dr. Hopkins's Portion—Constructional—, the bulk of the matter which has connection with the present *Department* will be found extending from pages 192 to 214,—COMPASS *actual;* and at commencing on page 315,—*Specifications of Foreign and British Organs* (only *some* of which have had their Ranges quoted by myself): the reader should also glance at pages from 98 to 105,—*Tablature*, and *Standard Size of Sounding Pipes.*

The matter given by *Dr. Rimbault* is, generally, of the most valuable and accurate kind; see, however, what was said, at immediately after the *Table of Ranges* furnished under Division *Instances General*, as to an error into which he has fallen in stating the Compass of the Organ in *Halberstadt* Cathedral. The Treatise by *Mr. Hopkins* is, on the *whole*, and setting aside some blunders in the more strictly technical portions, also excellent; and the Specifications just mentioned are valuable for Reference,—being usually trustworthy: but the two Chapters dealing with Compass are little better than a most vehement and one-sided Advocacy of the CC-CCC Bottom, entirely and exclusively,—as will have been already to some extent perceived in the virtual analysis entailed in Answering the Improper Objections made to the GG Range. Mr. Hopkins's most faulty dissertation does not even *hint* at the *radical Contrarience* of every "C" Bottom with the Bottom of the Human Voice, or at the equally pronounced *Agreement* of the "G" Basis with the same (although these are the only considerations of real *abstract* importance involved in the Question); and, while bemoaning the comparatively insignificant Breaks produced by Returning Pedal Pipes, altogether ignores the very far worse Distortions which the average CC-CCC Organ virtually forces upon the *Player*.

Catechism of the Organ. By *John Hiles*. Published by Brewer and Co., 38, Poultry, Cheapside, London, E.C. Price 1*s*. 0*d*.: Postage, 1½*d*. extra.

The Portions here concerned are at pages 5, and from 147 to 156,—Compass; and at pages from 7 to 10,—*Tablature*.

This Catechism cannot be pronounced a generally very accurate one; but its teaching on actual *Compass* is good, as a *whole*. It is, however, to be noted that Mr. Hiles wrongly defines (see his page 5) the Range of the C Pedals as being from *CC*, and thus in *Unison* with the Manuale; and, by this means, the Pedale Compass of the *Halberstadt* Organ—aforesaid—is by him made to appear (on page 155) one Octave too *high*.

Musical Opinion. Published at Sherborne Lane, London, E.C. Price 2*d*. per Monthly Number. Contains much indirect information on Organ Compass.

The Church Choir-Master and Organist. For Year 1868; Month, February; Page 22. Paper on Organ Compass: one of a Series by the *Present Writer*. Journal was Published at Burleigh Street, London, W.C. Copies may be had of Mr. Reeves, 185, Fleet Street, London, E.C. Price was 3*d*. per Monthly Number: Postage, extra. The Volumes will be found at the British Museum, London, W.C.

See also an interesting Letter, signed *FFF*, at Page 45 of the Number of the same Serial for March of the Year named.

The Paper by the present writer must not be accepted *Unreservedly*, for, naturally, in the space of more than Fifteen years, his opinions on the subject have undergone some *Changes*.

The Musical Times. For Year 1881; Month, January. A Letter on Sebastian Bach's highest Pedal Passages: by Mr. *H. H. Statham*. Journal is Published at 1, Berners Street, Oxford Street, London, W. Price, 3*d*. (now 4*d*.) per Monthly Number: Postage, 1*d*. extra.

This Letter has been already made some use of, in the *Definite Upward* [*Pedal*] *Directions* given under Division *Conclusions Reached*.

Acknowledgments.

The writer has to ACKNOWLEDGE the great Assistance which he has derived from the aforesaid Treatise by *Hopkins and Rimbault*, in respect of *Extracts* from many of its *Organ Specifications*, and of some *others* of its Items.

ADDENDA.

PAGE.

34 and 42. The Second Organ in Seville Cathedral possesses *Three* Manuals.

67. In Last Paragraph. The 32 ft. Register of the Temple Church Organ has *not*, up to the present time (1885), been carried below the FFF Pedal.

69. INSTANCES SPECIAL. The Church of St. John, at Waterbury, Conn., U.S., contains a fine Organ, By Hook and Hastings, in which the [CC] Swell Section has one or more of its 8 ft. Registers Finishing on *DD*♯,—or thereabouts.

120 to 125. In Large Organs the Discontinuation of one or more of the Secondary Registers below *DD*♯ will sometimes be found advantageous for one or more of the Manuals, especially for the *Swell*.

138. After First Paragraph. The Lowest Notes of the Swell Section, with its Reeds Throughout, Coupled to the Pedal Section, are frequently very fine *in themselves*, but are inadmissible for *many* Combinations required.

ERRATA.

Page	*Line*	*For*	*Read*
20	5th from bot.	1750 (abt.).	1740 (bel.).
20	4th from bot.	CC bel.	CC.
22	2nd from bot.	Believe since Extended	Since Extended
38	4th from bot.	Believe now to CC.	All Manuals (now 4) made CC to G^3 in 1862 or later.
68	9th from top	note	notes
91	20th from top	allued	alluded
118	19th from bot.	Lateral	Right-and-Left
123	3rd from top	allowed	sometimes allowed

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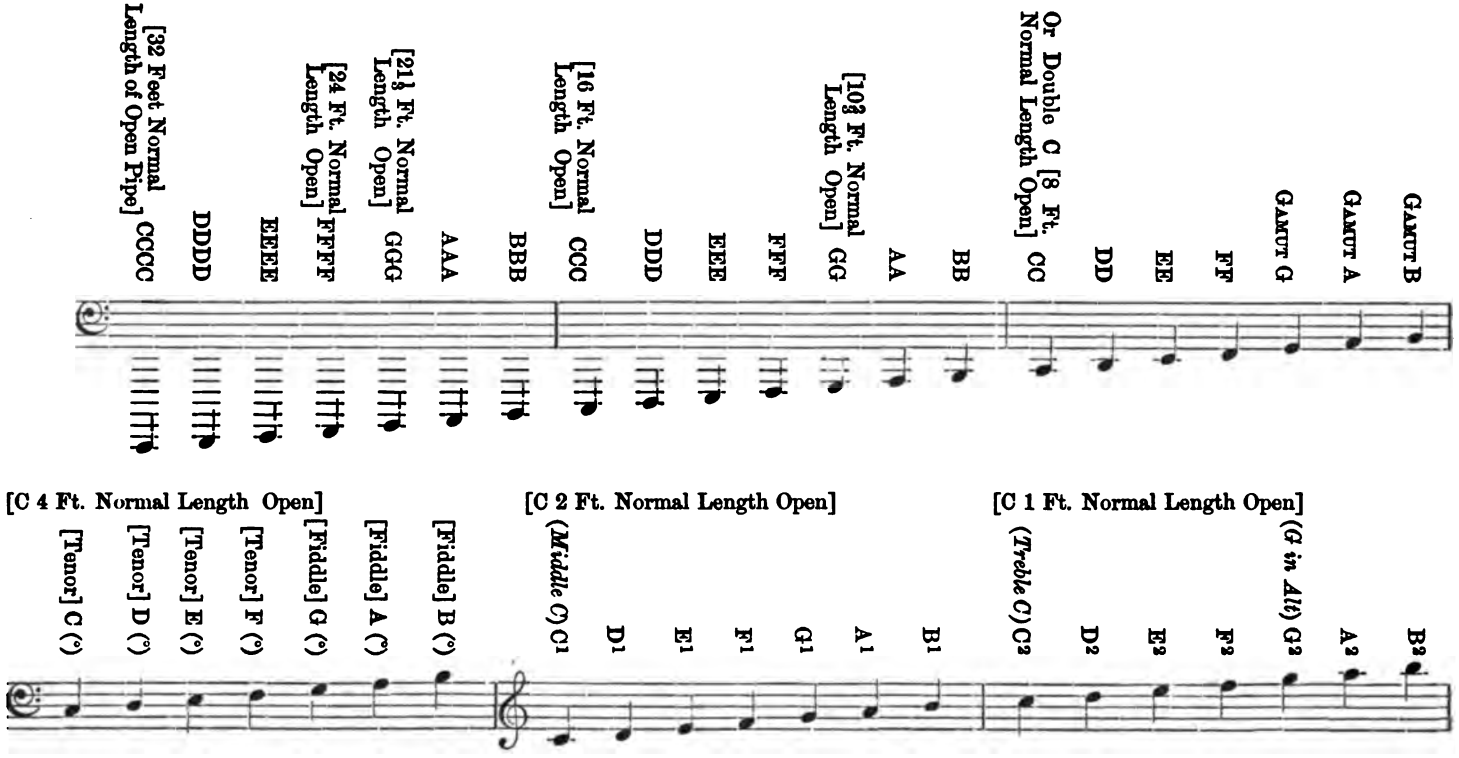
The Tablature Exhibited with Notation. *(See Page 6.)*


[32 Feet Normal Length of Open Pipe] CCCC
DDDD
EEEE
[24 Ft. Normal Length Open] FFFF
[21⅓ Ft. Normal Length Open] GGG
AAA
BBB
[16 Ft. Normal Length Open] CCC
DDD
EEE
FFF
[10⅔ Ft. Normal Length Open] GG
AA
BB
Or Double C [8 Ft. Normal Length Open] CC
DD
EE
FF
GAMUT G
GAMUT A
GAMUT B
[C 4 Ft. Normal Length Open]
[Tenor] C (°)
[Tenor] D (°)
[Tenor] E (°)
[Tenor] F (°)
[Fiddle] G (°)
[Fiddle] A (°)
[Fiddle] B (°)
[C 2 Ft. Normal Length Open]
(*Middle C*) C¹
D¹
E¹
F¹
G¹
A¹
B¹
[C 1 Ft. Normal Length Open]
(*Treble C*) C²
D²
E²
F²
(*G in Alt*) G²
A²
B²

It is not practically advisable to construct Pipes of Higher Sound than G⁵.

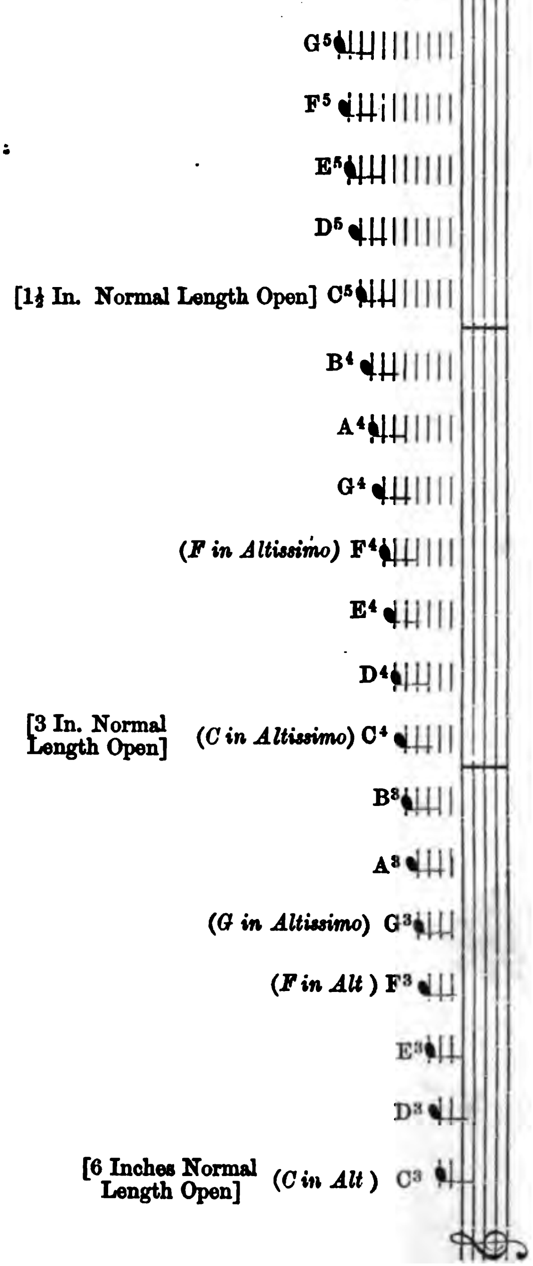
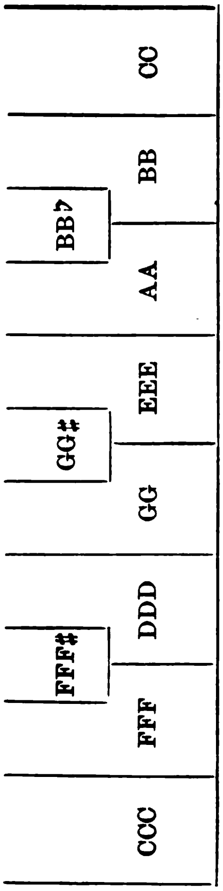

G⁵
F⁵
E⁵
D⁵
[1½ In. Normal Length Open] C⁵
B⁴
A⁴
G⁴
(*F in Altissimo*) F⁴
E⁴
D⁴
[3 In. Normal Length Open] (*C in Altissimo*) C⁴
B³
A³
(*G in Altissimo*) G³
(*F in Alt*) F³
E³
D³
[6 Inches Normal Length Open] (*C in Alt*) C³

DIAGRAM 2;

Old Italian Incomplete Octave. (*See Page 16.*)



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